



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 502-2011**

**DEVELOPMENT OF COMMUNITY PARK AT 561-569 SHERBROOK STREET**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 DEVELOPMENT OF COMMUNITY PARK AT 561-569 SHERBROOK STREET

### **B2. SUBMISSION DEADLINE**

**B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, August 1, 2012.**

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 may view the Site without making an appointment.

### **B4. ENQUIRIES**

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

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

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

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

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

### **B5. ADDENDA**

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

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

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

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B5.2.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **B6. SUBSTITUTES**

- B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
  - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
  - (c) identify any anticipated cost or time savings that may be associated with the substitute;
  - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
  - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B14.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B14.1(a).

## **B7. BID COMPONENTS**

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

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

- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B7.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:
- The City of Winnipeg  
Corporate Finance Department  
Materials Management Division  
185 King Street, Main Floor  
Winnipeg, MB R3B 1J1
- B7.5.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B7.6 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B14.1(a).
- B7.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.
- B7.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B7.8.2 Bids submitted by internet electronic mail (e-mail) will not be accepted.

**B8. BID**

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
  - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
  - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
  - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.3 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B8.4 Paragraph 10 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
  - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
  - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;
  - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

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

B8.4.2 All signatures shall be original.

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

## **B9. PRICES**

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

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

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

B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

## **B10. QUALIFICATION**

B10.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B10.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and



- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

B10.4 Further to B10.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractors has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>).

B10.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

## **B11. OPENING OF BIDS AND RELEASE OF INFORMATION**

B11.1 Bids will not be opened publicly.

B11.2 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/bidopp.asp>

B11.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>

B11.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

## **B12. IRREVOCABLE BID**

B12.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 of Form A: Bid.

B12.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 9 of Form A: Bid.

## **B13. WITHDRAWAL OF BIDS**

B13.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B13.1.1 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.

- B13.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B13.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
  - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid; and
  - (c) if the notice has been given by any one of the persons specified in B13.1.3(b), declare the Bid withdrawn.
- B13.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B12.2 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.

#### **B14. EVALUATION OF BIDS**

- B14.1 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 B10 (pass/fail);
  - (c) Total Bid Price;
  - (d) economic analysis of any approved alternative pursuant to B6.
- B14.2 Further to B14.1(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.
- B14.3 Further to B14.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B14.4 Further to B14.1(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.
- B14.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.
- B14.4.2 Further to B14.1(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.

#### **B15. AWARD OF CONTRACT**

- B15.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B15.2 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.

- B15.2.1 Without limiting the generality of B15.2, 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.
- B15.3 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 B14.
- B15.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.
- B15.4 Notwithstanding C4, the City will issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.
- B15.5 The Contract, as defined in C1.1, in its entirety shall be deemed to be incorporated in and to form a part of the Purchase Order notwithstanding that it is not necessarily attached to or accompany said Purchase Order.

## **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 development of a community park.

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

- (a) Earthwork and grading;
- (b) Tie-in to power source;
- (c) Tie-in to water source;
- (d) Supply and Installation of 1.5m high ornamental wood and chain-link fence;
- (e) Supply and Installation of CIP concrete paving;
- (f) Supply and Installation of CIP concrete header;
- (g) Supply and Installation of crushed shale pathway;
- (h) Supply and Installation of crushed limestone surfacing;
- (i) Supply and Installation of poured rubber play surfacing;
- (j) Supply and Installation of precast unit retaining wall;
- (k) Supply and Installation of rounded boulders;
- (l) Supply and Installation of Kompan Triple Shifter play structure;
- (m) Supply and Installation of benches;
- (n) Supply and Installation of accessible picnic table;
- (o) Supply and Installation of Picnic table;
- (p) Supply and Installation of waste receptacles;
- (q) Supply and Installation of Madrax 'Gridrac' bike rack;
- (r) Supply and Installation of site lighting;
- (s) Supply and Installation of sod and topsoil;
- (t) Supply and Installation of shrub bed mulch, filter fabric, and topsoil;
- (u) Supply and Installation of seed and topsoil;
- (v) Supply and Installation of snap edging;
- (w) Supply and Installation of drain stone;
- (x) Supply and Installation of plant material.

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

D3.1 The Contract Administrator is Hilderman Thomas Frank Cram, represented by:

Shannon D. Baxter  
Contract Administrator  
500-115 Bannatyne Avenue East

Telephone No. (204) 944-9907  
Facsimile No. (204) 957-1467

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

#### **D4. CONTRACTOR'S SUPERVISOR**

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

#### **D5. NOTICES**

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

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

D5.3 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 facsimile number:

The City of Winnipeg  
Chief Financial Officer

Facsimile No.: (204) 949-1174

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

The City of Winnipeg  
Legal Services Department  
Attn: Director of Legal Services  
185 King Street, 3rd Floor  
Winnipeg MB R3B 1J1

Facsimile No.: (204) 947-9155

#### **SUBMISSIONS**

#### **D6. AUTHORITY TO CARRY ON BUSINESS**

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

#### **D7. SAFE WORK PLAN**

D7.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D7.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg,

Corporate Finance, Materials Management Division website at  
<http://www.winnipeg.ca/matmgt/Safety/default.stm>

## **D8. INSURANCE**

- D8.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
  - (b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
  - (c) all risks installation floater, carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D8.2 Deductibles shall be borne by the Contractor.
- D8.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than seven (7) Calendar Days from notification of the award of Contract by Purchase Order.
- D8.4 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.

## **D9. PERFORMANCE SECURITY**

- D9.1 If the Contract Price exceeds twenty-five thousand dollars (\$25,000.00), the Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
  - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
  - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D9.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.
- D9.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of Purchase Order and prior to the commencement of any Work on the Site.

## **D10. SUBCONTRACTOR LIST**

- D10.1 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 seven (7) Calendar Days from notification of the award of Contract.

## **SCHEDULE OF WORK**

### **D11. COMMENCEMENT**

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

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

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

- (i) evidence of authority to carry on business specified in D6;
- (ii) evidence of the workers compensation coverage specified in C6.15;
- (iii) the Safe Work Plan specified in D7;
- (iv) evidence of the insurance specified in D8;
- (v) the performance security specified in D9;
- (vi) the Subcontractor list specified in D10; and

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

D11.2.2 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the Purchase Order.

### **D12. SUBSTANTIAL PERFORMANCE**

D12.1 The Contractor shall achieve Substantial Performance within thirty (30) consecutive Working Days of the commencement of the Work as specified in D11.

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

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

### **D13. TOTAL PERFORMANCE**

D13.1 The Contractor shall achieve Total Performance within thirty-five (35) consecutive Working Days of the commencement of the Work as specified in D11.

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

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



#### **D14. LIQUIDATED DAMAGES**

- D14.1 If the Contractor fails to achieve Total Performance in accordance with the Contract by the day fixed herein for Total Performance, the Contractor shall pay the City five hundred dollars (\$500) per Working Day for each and every Working Day following the day fixed herein for Total Performance during which such failure continues.
- D14.2 The amount specified for liquidated damages in D14.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Total Performance by the day fixed herein for same.
- D14.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

#### **D15. SCHEDULED MAINTENANCE**

- D15.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Maintenance of seed as specified in E14
  - (b) Maintenance of sod as specified in E14
  - (c) Maintenance of trees as specified in E14
  - (d) Maintenance of shrub beds as specified in E14.
- D15.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

#### **CONTROL OF WORK**

##### **D16. JOB MEETINGS**

- D16.1 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.
- D16.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

##### **D17. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

- D17.1 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).

##### **D18. SITE RESTORATION**

- D18.1 Total Performance of the Work shall not be attained until the Contractor has cleaned up the Site and has removed all tools, equipment, waste, debris, and surplus foundation earth to the satisfaction of the Contract Administrator. Unless otherwise specified, and as a condition of Total Performance, the Contractor shall restore all areas of the Site beyond the established limit of Work which have been disturbed by the Contractor's operations to as good as or better than

the original condition to the satisfaction of the Contract Administrator. The Contractor shall pay all costs associated with this Work.

## **MEASUREMENT AND PAYMENT**

### **D19. INVOICES**

D19.1 Further to C12, the Contractor shall submit an invoice for each order delivered to:

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

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

D19.2 Invoices must clearly indicate, as a minimum:

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

D19.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D19.4 Bids Submissions must be submitted to the address in B7.5.

### **D20. PAYMENT**

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

## **WARRANTY**

### **D21. WARRANTY**

D21.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D21.1.1 For the purpose of Performance Security, the warranty period shall be one (1) year.

D21.2 Notwithstanding C13.2, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D21.2.2 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

**FORM H1: PERFORMANCE BOND**  
(See D9)

KNOW ALL MEN BY THESE PRESENTS THAT

\_\_\_\_\_ ,  
(hereinafter called the "Principal"), and

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

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

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

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

BID OPPORTUNITY NO. 502-2011

DEVELOPMENT OF COMMUNITY PARK AT 561-569 SHERBROOK STREET

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

\_\_\_\_\_  
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 502-2011  
DEVELOPMENT OF COMMUNITY PARK AT 561-569 SHERBROOK STREET

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

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

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

\_\_\_\_\_  
Canadian dollars.

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

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

Partial drawings are permitted.

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

\_\_\_\_\_  
(Address)

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

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

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

\_\_\_\_\_  
(Date)

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

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

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

\_\_\_\_\_  
(Name of bank or financial institution)

Per: \_\_\_\_\_  
(Authorized Signing Officer)

Per: \_\_\_\_\_  
(Authorized Signing Officer)



## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS 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.
- E1.2.3 *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>
- E1.2.4 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.5 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
L-1.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Demolition Plan
L-2.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Layout Plan
L-3.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Grading Plan
L-4.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Materials Plan
L-4.2	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Site Furnishings Plan
L-5.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Planting Plan
L-6.1	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Details 1
L-6.2	SPENCE NEIGHBORHOOD - ABORIGINAL SPIRIT PARK: Details 2
SD-243	SODDING DETAILS
SCD-515	CONIFEROUS TREE PLANTING (PARKS)
SCD-517	STANDARD DETAIL FOR TREE PLANTING
SCD-122	TACHE STYLE METAL FRAME PICNIC TABLE
SCD-130A	TACHE STYLE WHEELCHAIR METAL FRAME PICNIC TABLE
SCD-652	PARK LIGHT BASE DETAIL
SCD-152B	CHAIN LINK FENCING W/P.T. POSTS
E1.0R	SITE PLAN, DETAILS - ELECTRICAL
H534.04	OVERALL LAYOUT
H534.04	DETAILS

### GENERAL REQUIREMENTS

#### E2. LAYOUT OF WORK

- E2.1 Further to CW 1130, Paragraph 3.15 – Stakes and Marks, the Contractor shall set all necessary control lines, benchmarks, survey elevation stakes and layout in consultation with the Contract Administrator as required.
- E2.2 The Contractor shall locate and protect all underground utilities prior to commencing construction.

#### E3. PEDESTRIAN AND TRAFFIC CONTROL

- E3.1 General Description
- E3.1.1 This Specification shall supplement Specification CW 1130-R1 Site Requirements and shall cover the supply, installation, maintenance, and removal of temporary traffic and pedestrian control.



- E3.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
- E3.2 Materials
- E3.2.1 General
- (a) All barricades, signs, flashers, and other equipment shall be in accordance with the "Manual of Temporary Control in Work Areas on City Streets."
- E3.2.2 Construction Fence
- (a) Metal chain link, 2.4 m height.
- E3.3 Construction Methods
- E3.3.1 General
- (a) The Contractor will be responsible for the placement of all required signing and barricades, for traffic control in the construction area.
- E3.3.2 Snow Fence
- (a) Erect snow fencing surrounding the areas under construction and any excavations deeper than 500 mm.
- (b) Snow fencing shall be placed so as to present no hazard to vehicles or pedestrians and shall be kept securely fastened and neat in appearance at all times.
- E3.4 Quality Control
- E3.4.1 All workmanship and all materials furnished and supplied under this Specification are subject to the 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 which are not in accordance with the requirements of this Specification. The Contractor shall maintain all traffic control as specified herein.
- E3.4.2 If, in the opinion of the Contract Administrator, the traffic control is not in accordance with this Specification, the Work in the affected area shall be stopped and shall not resume until such time as the traffic control deficiencies are corrected to the satisfaction of the Contract Administrator. No contract time extensions will be granted as a result of lost time due to Work stoppages because of inadequate traffic control by Contractor.
- E3.5 Method of Measurement and Basis of Payment
- E3.5.1 The supply, erection and maintenance of all pedestrian and traffic control, including snow fencing and signs, shall be included in the cost of the Work. No measurement or payment will be made for this Work.
- E4. CLEARING AND GRUBBING**
- E4.1 General Description
- E4.1.1 This Specification shall cover the removal from the Site rubbish and all other surface litter within the full limit of the Work, as shown on the Drawings, and the disposal of same in a manner hereinafter specified, and shall supplement Specification CW 3010-R4 Clearing and Grubbing.
- E4.2 Construction Methods

E4.2.1 The Contractor shall restrict his activities strictly to within the limit of the Works, unless receiving prior written approval from the Contract Administrator. The Contractor shall take all precautions to prevent damage to traffic, structure, pole lines, adjacent property and to shrubs designated to remain, and he shall be liable for any damages occurring during the performance of this Work.

E4.2.2 The Contractor shall load and haul all rubbish and all other surface litter from the Site and dispose of these materials at dumps located by the Contractor and reviewed by the Contract Administrator. Any materials dropped or spilled on any streets during the hauling operations shall be promptly clean up by and at the expense of the Contractor, to the satisfaction of the Contract Administrator.

E4.2.3 The Contractor shall ensure that upon completion of the clearing and grubbing operations, the Site shall be left free of any hazardous depressions and in a neat condition.

E4.3 Method of Measurement and Basis of Payment

E4.3.1 No separate measurement or payment shall be made for clearing and grubbing. This Work shall be incidental to Earthwork and Grading.

**E5. EARTHWORK AND GRADING**

E5.1 Description

E5.1.2 This Specification shall cover the excavation and installation of fill for areas as indicated on the Drawings and in compliance with Specification CW3170-R3 Earthwork and Grading.

E5.1.3 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work as specified herein and in accordance with CW 3170-R3.

E5.2 Materials

E5.2.1 All materials shall conform to CW 3170-R3.

E5.3 Equipment

E5.3.1 All equipment to conform to CW 3170-R3.

E5.4 Construction Method

E5.4.1 Rough grade to patterns and elevations as indicated on the Drawings allowing for installation of materials specified and in accordance with CW 3170-R3.

E5.5 Method of Measurement and Basis of Payment

E5.5.1 Earthwork and Grading will be paid for on a lump sum basis. Price shall be payment in full for placing/removing material and for performing the Work.

**E6. GRANULAR SURFACING**

E6.1 Description

E6.1.2 This Specification shall amend and supplement Specification CW 3110-R11 Sub-Grade, Sub-Base, and Base Course Construction. The Work to be done by the Contractor under this Specification shall cover all phases of supply and installation of Granular Surfacing.

E6.2 Materials

- E6.2.1 Limestone surfacing shall consist of a 150 mm base course depth of 19 mm diameter crushed limestone down, with a 50 mm depth of 6 mm diameter limestone capping as per Drawing L-4.1 and Detail 1/L-6.1.
- E6.2.2 Shale surfacing shall consist of a 150 mm base course depth of 19 mm diameter crushed limestone down, with a 50 mm depth of 6 mm diameter crushed shale capping as per Drawing L-4.1 and Detail 1/L-6.1.
- E6.3 Construction Method
  - E6.3.1 The Contractor shall survey and stake out pathway prior to the start of construction as shown on the construction drawings. Layout and grades of pathway shall be checked and confirmed with Contract Administrator prior to construction.
  - E6.3.2 All granular base course shall be placed and compacted to the finished thickness as specified on the drawings.
  - E6.3.3 Base Course and Capping Course shall be compacted to a minimum of hundred (100%) of Standard Proctor Density.
- E6.4 Method of Measurement and Basis of Payment
  - E6.4.1 Granular Surfacing will be paid for on a square metre basis. Price shall be payment in full for supplying materials and for performing the Work.
- E7. CONCRETE HEADERS AND PAVING**
- E7.1 Description
  - E7.1.1 This Specification shall cover the installation of cast-in-place concrete headers and paving, as indicated on the Drawings.
  - E7.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work as specified herein and in accordance with Specification CW 3310-R14 Portland Cement Concrete Pavement Works and Specification CW 3325-R4 Portland Cement Concrete Sidewalk.
- E7.2 Materials
  - E7.2.1 All materials shall conform to CW 3310-R14 and CW 3325-R4.
- E7.3 Construction Method
  - E7.3.1 Construction method shall conform to CW 3310-R14 and CW 3325-R4.
- E7.4 Method of Measurement and Basis of Payment
  - E7.4.1 Concrete headers will be paid for on a linear metre basis. Price shall be payment in full for supplying materials and for performing the Work.
  - E7.4.2 Concrete paving will be paid for on a square metre basis. Price shall be payment in full for supplying materials and for performing the Work.
- E8. CHAIN LINK FENCING**
- E8.1 Description
  - E8.1.1 This Specification shall cover the supply and installation of chain link fencing along one edge of site.

## E8.2 Materials

- E8.2.1 Chain link fencing and p.t. wood posts as per Detail SCD-152B Chain Link Fencing with p.t. Posts as indicated on Detail 3/L-6.2 and in accordance with Specification CW3550-R2 Chain Link Fencing.

## E8.3 Construction Method

- E8.3.1 Chain link fencing shall be installed as per SCD-152B and in accordance with City of Winnipeg's Standard Construction Specification CW3550-R2 Chain Link Fencing.

## E8.4 Method of Measurement and Basis of Payment

- (a) Fence will be paid for on a lineal metre basis. Price shall be payment in full for supplying materials and for performing the Work.

## E9. PRECAST UNIT RETAINING WALL

### E9.1 Description

- E9.1.1 This Specification shall cover the supply and installation of a precast unit retaining wall as indicated on the Drawings.

### E9.2 Protection

- E9.2.1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, roads and adjacent property. Make good any damage.

### E9.3 Materials

#### E9.3.1 Precast Concrete Retaining Wall Units

- (a) Concrete wall units shall have minimum 28 day compressive strength of 3,000 psi in accordance with ASTM C-90. The concrete shall have adequate freeze-thaw protection with an average absorption rate of 5%.
- (b) Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations shall be 10 mm (not including textured face).
- (c) Retaining wall units shall provide a minimum of 475 kg total weight per square metre of wall face area. Fill contained within the units may be considered 80% effective weight
- (d) Exterior face shall be textured.
- (e) Colour: AB Manitoba Stone
- (f) Type: Standard 12 degree AB Stone by Allan Block. Standard block units, corner units, and coping units as required.

(A) Contact for AB Stone

CCI Industries  
1436 Chevrier Blvd  
Winnipeg, MB R3T 1Y6  
Ph: (204) 453-8335  
Fax: (204) 453-5205

#### E9.3.2 Granular Base

- (a) To conform to the requirements of E6.

#### E9.3.3 Drainage Medium

- (a) Free draining granular fill free of fines. 12mm (quarter down) with maximum 5% passing #200 sieve and less than 50% passing #4 sieve.

- E9.3.4 Tie Back System
  - (a) Manufacturer's standard geosynthetic fabric system.
- E9.3.5 Drain Pipe
  - (a) Perforated plastic pipe and fitting to CAN/CSA-B182.1. Size as indicated complete with geotextile sock.
- E9.3.6 Block Adhesive
  - (a) "PL Premium Construction" or approved equal.
- E9.3.7 Concrete
  - (a) To Section E7.
- E9.4 Construction Method
  - E9.4.1 Preparation
    - (a) Obtain Contract Administrator approval of retention wall location prior to commencing installation.
    - (b) Rough grade to depth required for surface treatments as indicated on Drawings.
  - E9.4.2 Inspection
    - (a) Subgrade is to be unfrozen and free from snow or ice.
    - (b) Check graded subgrade for conformity with elevations and sections before placing granular base materials.
    - (c) Notify Contract Administrator of any unsatisfactory conditions.
  - E9.4.3 Granular Base
    - (a) Place granular base to compacted thickness as indicated.
    - (b) Place in layers not exceeding 150 mm compacted thickness. Compact each layer to minimum 98% maximum dry density as determined by Standard Proctor Density.
  - E9.4.4 Precast Concrete Retaining Walls
    - (a) Place fine granular fill screeded to 20 mm compacted thickness.
    - (b) Install units per manufacturer's written specifications and as indicated on Drawings.
    - (c) Where required, cut units with approved cutter or saw to fit accurately, neatly, and without damaged edges. Use corner units on all corners.
    - (d) Replace rejected, damaged, or defective units with sound units.
    - (e) All coping pieces must be securely attached with large amounts of block adhesive.
  - E9.4.5 Finish Tolerances
    - (a) Finish surface to within 25 mm (1") of established grade but not uniformly high or low.
    - (b) Correct irregularities by loosening and adding or removing material until surface is within specified tolerance.
- E9.5 Method of Measurement and Basis of Payment
  - (a) Precast unit retaining wall will be paid for on a square metre of face basis. Price shall be payment in full for supplying materials and for performing the Work.

## **E10. TOPSOIL AND FINISH GRADING**

### **E10.1 General Description**

- E10.1.1 This Specification shall cover the supply and installation of topsoil for shrub beds and areas to be seeded and sodded, as specified herein and as indicated

- on the Drawings, and in accordance with Specification CW 3540-R5 Topsoil and Finish Grading for Establishment of Turf Areas.
- E10.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified and in accordance with CW 3540-R5.
- E10.2 Protection
- E10.2.1 Protect elements surrounding the Work of this section from damage or disfiguration.
  - E10.2.2 Protect landscaping and other features remaining as final Work.
- E10.3 Source Quality Control
- E10.3.1 Inform Contract Administrator of proposed source of topsoil to be supplied and provide sample for review by Contract Administrator prior to installation.
  - E10.3.2 Test topsoil for clay, sand and silt, NPK, Mg, soluble salt content, pH value, growth inhibitors and soil sterilants.
- E10.4 Submittals
- E10.4.1 Submit 0.5 kg sample of topsoil to testing laboratory and indicate present use and intended use. Prepare and ship sample in accordance with provincial regulations and testing laboratory requirements.
  - E10.4.2 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.
  - E10.4.3 Provide Contract Administrator with a sample of the proposed mulch for approval prior to ordering materials.
- E10.5 Delivery and Storage
- E10.5.1 Deliver and store fertilizer in waterproof bags accompanied in writing by weight, analysis and name of manufacturer.
- E10.6 Materials
- E10.6.1 Topsoil: In accordance with CW 3540-R5.
  - E10.6.2 Planting soil mix: black topsoil, a fertile friable loam containing by volume not less than 4% and no more than 25% of organic matter for clay loams, and not less than 2% and no more than 25% for sandy loams, with an acidity value ranging from pH 6.0 to 8.0 and capable of sustaining vigorous plant growth. Soil is to be free of any mixture of subsoil, clay lumps and free of stones and other extraneous matter. It shall not contain any couch or crabgrass rhizomes.
  - E10.6.3 Mulch: chips from hardwood trees, free of bark, branches and leaves, varying in size from 50-75 mm (2"-3") by 6-20 mm (1/4"-3/4") thick. Color: brown.
  - E10.6.4 Stone for wet shrub bed base: clean drainage stone, varying in size from 38-64 mm (3/4" to 1-1/2").
- E10.7 Construction Method
- E10.7.1 In accordance with CW3540-R5.
  - E10.7.2 Place topsoil in tree planting areas to depth of tree rootball. Cover planted tree topsoil with 75 mm mulch as indicated on Drawings.

- E10.7.3 Place topsoil in excavated shrub beds to depth of 300 mm. Cover planted shrub bed soil with 75 mm mulch as indicated on Drawings.
- E10.7.4 Place topsoil for sod areas to depth of 75mm.
- E10.7.5 Place topsoil for seed areas to depth of 75mm
- E10.7.6 Finish Grading
  - (a) Fine grade entire topsoiled area to contours and elevations as indicated on Drawing L-3.1 "Grading Plan." Eliminate rough spots and low areas to ensure positive drainage to catch basins and area drains.
  - (b) Prepare loose friable bed by means of rototilling and subsequent raking. Roll lightly and rake wherever topsoil is too loose.
  - (c) Leave surface smooth, uniform, firm against deep foot printing, with a fine loose texture.
- E10.7.7 Surplus Material
  - (a) Dispose of surplus topsoil not required for fine grading and landscaping, off Site.

E10.8 Method of Measurement and Basis of Payment

- (a) The supply and install of topsoil and grading will be measured on a unit basis and paid for at the Contract Unit Price. The amount to be paid for shall be the total number of units, as indicated on Form B: Prices. This price shall be full payment for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work and as accepted by the Contract Administrator.

**E11. TREE PLANTING IN PARKS**

- E11.1 This Specification shall cover the supply and installation of nursery grown trees in accordance with the working drawings and the Contract documents on all properties that are owned by, or under the jurisdiction of, the City of Winnipeg.
- E11.2 The Contractor shall ensure only experienced personnel, under the direction of a skilled supervisor, shall execute all of the Work. The supervisor shall be on Site at all times during the Work and shall be authorized to make binding decisions on behalf of the Contractor.
- E11.3 It is understood that the Contract Administrator shall consult with the City Forester on matters which do not conform to, or which are not addressed, by these Specifications.
- E11.4 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed in Form B Prices, shall apply to the Work.
  - (a) *The City of Winnipeg Standard Construction Specifications* is available on the information. Connection page at the City of Winnipeg Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
  - (b) The version in effect three (3) Business Days before the Submission Deadline shall apply.

**E12. PUBLIC SAFETY/TRAFFIC CONTROL**

- E12.1 In accordance with the Manual of Temporary Traffic Control, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Section of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by the Traffic Services Section of the City of Winnipeg in connection with the works undertaken by the Contractor. The requirements shall include the following:
  - (a) The Contractor shall barricade the sidewalk surrounding the Work.

- (b) The Contractor shall maintain traffic flow and ensure that protection is afforded to the road user and that the Contractor's operations shall in no way interfere with the safe operation of traffic.

### **E13. TREE SITES & LAYOUT**

- E13.1 The park sites and approximate tree planting locations are found within the attached Drawings. Exact planting locations are to be determined on Site by the Contract Administrator.
- E13.2 The Contractor shall obtain all necessary utility clearances prior to the commencement of planting and in a timely manner so as not to jeopardize the schedule of the complete tree planting operation.
- E13.3 The Contractor is to comply with the instructions on the utility clearance sheets.
- E13.4 Trees are not to be planted directly above underground utilities, unless hydro-excavation techniques are used.
- E13.5 Where a specified planting Site conflicts with underground utilities, the Contractor may modify the precise location in compliance with the utility clearances and the following Minimum Distance Guidelines:
  - (a) Intersections: 6m
  - (b) Private approaches: 1.5m
  - (c) Light standards, hydro poles, hydrants, manholes and sewer grates: 3m
- E13.6 Where a planting Site must be modified by more than 1 metre, the Contractor must receive prior approval from the Contract Administrator or designate.

### **E14. SUPPLY & PREPLANTING CARE OF TREES**

- E14.1 The Contractor shall be responsible for supplying and transporting trees to the appropriate planting Sites.
- E14.2 The Contractor shall coordinate the shipping of trees and excavation of tree pits to ensure no more than a maximum of a 24 hour time lapse has occurred between the plant material arriving on Site and the installation of that plant material.
  - (a) Trees shall be transported with care taken to prevent damage:
    - (i) Protect trees against abrasion, exposure and extreme temperature change during transit.
    - (ii) Avoid binding of trees with rope or wire that would damage bark, break branches or destroy natural shape of tree.
    - (iii) Point of contact with equipment shall be padded.
    - (iv) Give full support to root ball of trees during lifting.
      - (A) Each balled specimen shall be handled with sufficient care, so that the root balls shall not be broken;
      - (B) Broken root balls or root ball consisting of loose soil will not be accepted and shall be replaced;
      - (C) Broken roots of deciduous stock shall be pruned back prior to planting.
  - (b) Trees with broken or damaged trunks or branches are not acceptable. Trees with damaged trunks, however caused, will be rejected. No exceptions shall be made in this respect.
  - (c) Keep roots moist and protected from sun and wind.
    - (i) Trees that cannot be planted immediately shall be well protected against damage and drying out; if necessary, trees shall be heeled-in in a shaded area and watered well.



## **E15. TREE PLANTING MATERIALS**

- E15.1 The Contractor shall be responsible for the supply of:
- (a) Plant material;
  - (b) The safe handling, pick up and delivery of trees to the planting Sites;
  - (c) The supply of soil, water, trunk protection, and T-bars as set forth in these Specifications.
- E15.2 All materials supplied by the Contractor under these Specifications shall be subject to random inspection and testing by the Contract Administrator.
- E15.2.1 The Contract Administrator may reject any material(s) that do not comply.
  - E15.2.2 There shall be no charge to the City for any material samples taken for testing by the Contract Administrator.

## **E16. TREES**

- E16.1 Trees shall be the size and variety noted on the Plant List shown on Drawing L-4.1. Plant material which does not have the specified root ball diameter as mentioned in plant list will be rejected.
- E16.2 All nursery stock supplied shall be Canadian prairie nursery grown, of the species and sizes indicated on the drawings. Quality shall be in accordance with the latest "Guide Specification for Nursery Stock of the Canadian Nursery Trades Association".
- E16.3 Any nursery stock dug from native stands, wood lots, orchards or neglected nurseries and which have not received proper cultural maintenance as advocated by the Canadian Nursery Trades Association, shall be designated as "collected plants". The use of "collected plants" will not be permitted unless approved by the Contract Administrator.
- E16.4 The Contract Administrator reserves the right to inspect the plant material at their original source, and to instruct the supplier on root and branch pruning requirements.
- E16.5 Nomenclature of specified nursery stock shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific names given in the latest edition of standardized Plant Names. The names of varieties not names therein are generally in conformity with the names accepted in the nursery trades.
- E16.6 Plants larger than specified may be used if approved by the Contract Administrator. The use of such plants shall not increase the Contract price.
- E16.7 All nursery stock shall be measured when the branches are in their normal position. Height and spread dimensions specified refer to the main body of the plant and not from branch tip.
- E16.8 Where trees are measured by calliper (cal.), reference is made to the diameter of the trunk measured 300 mm above ground as the tree stands in the nursery.
- E16.9 All nursery stock shall be well branched, true to type, structurally sound, possess a well developed, undamaged root system and shall be free of disease, insect infestations, rodent damage, sunscald, frost cracks and other abrasion or scare to the bark. All parts of the nursery stock shall be moist and show live, green cambium when cut.
- E16.10 All trees shall have one only, sturdy, reasonably straight and vertical trunk and a well balanced crown with fully developed leader. All evergreens shall be symmetrically grown and branched from ground level up, and must be balled and burlapped unless noted otherwise on the plant list. At least one plant of each variety supplied shall bear a tag showing both the botanical and common name of the plant.
- E16.11 Protection of Stock

- E16.11.1 All nursery stock shall be well protected from damage and drying out from the time of digging until the time of planting on Site. All roots shall be cleanly cut; split roots are not acceptable.
- E16.11.2 Nursery stock shall be transplanted with care to prevent damage. Points of contact with equipment shall be padded. All nursery stock, which cannot be planted immediately upon arrival at the Site, shall be well protected to prevent drying out and shall be kept moist until commencement of planting.

## **E17. PLANTING SOIL**

- E17.1 The planting soil shall be topsoil that complies with CW 3540, Section 5.2.
  - E17.1.1 Further to CW 3540 Section 5.2, planting soil shall contain maximum ten percent (10%) organic matter (peat, rotted manure or composted material).
- E17.2 At the discretion of the Contractor Administrator, planting soil may be subject to tests for nitrate, phosphate, potassium, sulphate, pH, E.C. (salinity), and volume of organic matter, by a testing laboratory designated by the Contract Administrator.
- E17.3 The Contract Administrator reserves the right to reject planting soil not conforming to the requirements of these Specifications.

## **E18. WATER**

- E18.1 The Contractor shall provide water, so that:
  - (a) All costs to provide water for the watering operation and all associated costs shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.
  - (b) Further to clause 3.7 of CW 1120-R1, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.
- E18.1.1 Water shall be free of oils, acids, alkalis, salts and other substances that may be detrimental to plant growth. Water suitable for human consumption shall be acceptable without testing.
- E18.1.2 Water from rivers and streams shall not be used without prior approval of the Contract Administrator.
- E18.2 Should the Contract Administrator determine that water quality testing is necessary, an approved testing laboratory shall perform the test at the sole expense of the Contractor.

## **E19. TREE PROTECTION/SUPPORT DURING INSTALLATION**

- E19.1 Upon completion of the planting operation, the Contractor shall slice open a 100 mm diameter x 600 mm long section of plastic weeping tile material and place around the base of each tree trunk.
- E19.2 Stakes shall be T-rail iron stakes 40 x 40 x 5 x 1540 mm long, primed with 1 brush coat of zinc rich plant paint to CGSB 1-GP-191B. Stakes shall be uniform in style and colour.

- (a) Other products may be used with prior permission in writing from the Contract Administrator.

E19.3 The guying straps shall be attached in accordance with the drawings referenced in SCD- 515 and SCD-517 and shall be of a material that is non-abrasive to the tree to prevent girdling injury:

- (a) Hose- covered wire, flexible belting or any strong, soft wide strips of material is acceptable.

E19.4 Where wire is used, ensure ends are twisted tight:

- (a) Protruding ends are unacceptable.

## **E20. MULCH**

E20.1 The Contractor shall provide mulch. Mulch shall:

- (a) Be a clean bark or wood chip free of leaves, branches and other extraneous matter; and
- (b) Consist of chips not less than 15 mm nor larger than 75 mm in size and not more than 20 mm thick.

## **E21. TREE PITS**

E21.1 Tree shall be excavated using the following methods (see SCD-517):

- (a) Tree pits shall be minimum 2 times the diameter of the root ball.
- (b) Tree pits shall be excavated using a backhoe or hand shovel.
- (c) Pit depth shall be such that the top of the root ball is even with the existing grade.

E21.2 The sides of all tree pits shall be scarified to the depth of one shovel blade.

E21.3 The bottom of all excavations shall be protected against freezing.

E21.4 Tree pits shall be left open for a maximum of 24 hours.

- (a) Pits that are left open overnight must be covered with a sheet of plywood and be marked with a minimum of one (1) safety cone.
  - (i) Plywood shall be a minimum thickness of 5/8".

## **E22. PLANTING PERIOD**

E22.1 The Contractor shall not plant trees during periods of extreme heat, at the discretion of the Contract Administrator.

- (a) The City of Winnipeg reserves the right to refuse acceptance of any or all trees failing to meet the above timing restrictions.

## **E23. PLANTING**

E23.1 The Contractor is expected to plant trees as follows:

- (a) All trees shall be set plumb and shall be placed in the centre of the tree pit;
- (b) Trees shall be placed on undisturbed soil and to a depth equal to that at which they were originally growing at the nursery;
- (c) Once the tree has been set in its final position, burlap on the root ball shall be cut from the top 1/3 of the root ball:
  - (i) If a wire basket has been used, it shall be cut off from the top 1/3 of the root ball.
  - (ii) All twine shall be removed from the root ball.
- (d) After the root ball is prepared, fill tree pit with planting soil as per E6.14, in layers of 150 mm depth and compact the independent layers of soil by tamping;

- (e) Tamp soil around root system to eliminate air voids;
- (f) Grade the area around the tree according to the drainage type; and
- (g) All planting areas shall be levelled, raked and edged to give a neat appearance.

E23.2 Upon completion of the planting operation, the Contractor shall:

- (a) Install tree trunk protection;
- (b) Install stakes and straps;
- (c) Form a water dish from the soil around the outside edge of the root ball with a berm 100 mm in height:
  - (i) Soil shall not be piled around the tree trunk.
- (d) Install wood chips or other mulch;
- (e) Administer watering:
  - (i) Watering must be done slowly to ensure that water does not run away from the root zone and so the top 300 mm of the soil around the root system of the tree are well saturated;
  - (ii) Use a low-pressure open flow nozzle and hose; and
  - (iii) The water stream must not gouge out a hole in the soil or mulch.

## **E24. TREE MAINTENANCE**

### **GENERAL**

E24.1 The Contractor shall cover the maintenance of trees for a period of two years from the date of the tree planting was completed. The Contractor shall furnish all labour, materials, equipment and services necessary to perform ongoing care of the plant material, which shall include but not be limited to:

- (a) Mulching, in accordance with E15.23;
- (b) Watering; and
- (c) Weed control.

### **METHODS**

E24.2 The Contractor shall:

- (a) Program the timing of operations to plant growth, weather conditions and use of the Site;
- (b) Do each operation continuously and complete within a reasonable time period;
- (c) Store equipment and materials off-site;
- (d) Add additional mulch as required to maintain minimum constant depth of mulch;
  - (i) Clean up edges and contain mulch within the designated area;
- (e) Water trees as follows:
  - (i) Immediately upon being planted and every week for the first three (3) weeks after planting;
  - (ii) Thereafter, watering shall be done every 7 – 14 days between May and October or as frequently as necessary (compensating appropriately for weather) to sustain vigorous plant growth;
  - (iii) By watering slowly to ensure that water does not run away from the root zone and so the top 300 mm of soil around the root system of the tree is well saturated;
  - (iv) By using a low pressure open flow nozzle and hose. The water stream must not gouge out a hole in the soil or mulch;

- (v) By using the recognized standard for tree watering as approximately 8-10 times during the growing season with the following amounts of water depending on the calliper of the tree – the rule of thumb is 40 litres of water per 25 mm calliper;
  - (vi) By recognizing watering requirements of trees are dependant upon on a number of variables such as tree species, soil type, when planted, and weather including precipitation. These watering requirements are a minimum standard and shall be followed unless otherwise directed by the Contract Administrator or his designate.
  - (vii) By applying a final watering for all trees, regardless of when planted, that shall be completed after temperatures fall below freezing to ensure adequate moisture in root zone at freeze-up;
- (f) Maintain surface of tree pit by hand weeding during the watering process as follows:
- (i) Do not allow weeds to establish for a period longer than two (2) weeks; and
  - (ii) Do not use any herbicides for weed control near trees unless authorized by the Contract Administrator.
- E24.3 The Contractor must inform the Contract Administrator of watering progress and schedule by 9:00 AM each day of watering.
- E24.4 The Contractor must inform the Contract Administrator immediately of any equipment breakdown or delay in watering and maintenance. Once a watering cycle is completed, submit a log-sheet to the Contract Administrator identifying the following:
- (a) The location where maintenance Work is carried out; and
  - (b) Preventative or corrective measures required which are outside Contractors' responsibility.
- E24.5 Any trees planted to replace trees that have died during the maintenance period will receive full 2 years maintenance from the date that the replacement tree was accepted.

## **TREE PROTECTION/SUPPORT**

- E24.6 The tree protection collars, staking material and all attachments to trees shall be removed by the Contractor upon completion of the maintenance period.

## **E25. TREE MORTALITY**

### **CONTRACTOR SUPPLIED TREES**

- E25.1 If a Contractor-supplied tree dies and the Contractor has not been submitting the regular maintenance records in accordance with these specifications, then the cost to supply, plant and maintain a replacement tree as originally indicated in the Contract document, shall be at the sole expense of the Contractor.
- E25.2 If a Contractor-supplied tree dies and the Contractor has been submitting the regular maintenance records in accordance with these specifications, that tree will be added to the Contract at the originally specified bid price to be supplied, planted and maintained by the Contractor in accordance to this specification.
- E25.3 Replacement trees shall receive 2 years maintenance as outlined in the Contract document, from the date of replacement.
- E25.4 Inspections of replacement trees will be conducted by City of Winnipeg staff.

## **E26. TREE INSTALLATION PAYMENT**

- E26.1 Method of Measurement and Basis of Payment

- E26.1.1 Plant Material will be measured on a per unit basis. The number to be paid for shall be the total number of each type and size of tree supplied and installed in accordance with the Specification and accepted by the Contract Administration.
- E26.1.2 The supply and installation of Plant Material will be paid for at the Contract unit price for each tree, Item 13 Plant Material, measured as specified herein, which price shall be payment in full including all costs for the tree, tree pit and topsoil backfill, tree stakes, tree rings, pruning, two year maintenance, and all other items incidental to the Work included in this Specification.
- E26.1.3 Twenty-five (25) % of the value of all plant material, as itemized on the unit price form, Item 25 Plant Material, shall be held back to pay for the two year maintenance period.
- E26.1.4 Seventy-five (75) % of the value of all plant material, as itemized on the unit price form, Item 25 Plant Material, will be paid for when the plant material complies with the supply and installation sections of the specification requirements and is accepted by the Contract Administrator.

**E27. TWO YEAR TREE MAINTENANCE PAYMENT**

**E27.1 Maintenance Period**

- E27.1.1 The two year maintenance period shall be based on a six month growing season per year. The two year maintenance program will consist of a total of 12 months of maintenance. In general the maintenance shall commence on May 1st and terminate on October 30th of each year. In the event of any early spring, whereby the weather conditions are conducive to plant growth, the Contractor shall start the maintenance period at such time as they deem necessary. However, the City of Winnipeg, Forestry Branch, must be notified prior to commencing the maintenance period. Where the maintenance Contract is started prior to May 1st, the actual number of days that the plant material is maintained prior to May 1st will be deducted from the October 30th completion period.

**E27.2 Cost of Two Year Maintenance Period**

- E27.2.1 The cost for the Two Year Plant Maintenance Period will be twenty-five (25) % of the total cost of all the trees, as shown in Form B: Prices, Item 13a to 13p inclusive. The remaining seventy five (75) % value will be paid on a per unit basis, for each plant properly installed, and which plant complies with the specification requirements.

**E27.3 Payment of Two Year Maintenance Period**

- E27.3.1 The basis of payment, will be based on a pro rated basis, based on each full month of maintenance, and the respective proportion of the total twelve (12) months. Progress payments will be made once a year at the end of each growing season.

## **E28. PLANTING SHRUBS**

### **E28.1 General Description**

- E28.1.1 This Specification shall cover the supply and installation of shrubs in areas as indicated on the Drawings.
- E28.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified herein.

### **E28.2 Related Sections**

- E28.2.1 E10: Topsoil and Finish Grading.
- E28.2.2 E24: Seeding.
- E28.2.3 E25: Sodding.
- E28.2.4 E26: Landscape Maintenance.

### **E28.3 Reference Standards**

- E28.3.1 Nomenclature: to "International Code of Nomenclature for Cultivated Plants."
- E28.3.2 Size and Development of Trees and Shrubs: to "Canadian Nursery Trades Association: Canadian Standards for Nursery Stock", latest edition, by Landscape Canada.

### **E28.4 Inspection By Contract Administrator**

- E28.4.1 The Contract Administrator will inspect plants at the following stages:
- (a) Plants at source.
  - (b) Installed plants before commencement of maintenance period.
  - (c) At end of maintenance period.
  - (d) Notify Contract Administrator 48 hours in advance of each required inspection.

### **E28.5 Delivery, Storage and Handling**

- E28.5.1 Handle plants with reasonable care and skill to prevent injuries to trunk, branches and roots. Damaged plant material to be immediately replaced at no cost to the Owner.
- E28.5.2 Protect plants during shipment and until planted on Site, with tarpaulin or other suitable covering to prevent excessive drying from sun and wind, and breakage from wind and equipment.
- E28.5.3 Do not use plants whose soil balls have been cracked or broken before or during planting or when burlap ropes required in connection with their transplanting have been removed.
- E28.5.4 Replace damaged plants at no cost to Contract Administrator.
- E28.5.5 Do not transport trees and shrubs in open trucks when the temperature is in excess of 25°C, or at speeds in excess of 60 km/h.

E28.6 Warranty

- E28.6.1 Replace plants when found dead or not in healthy and satisfactory growing condition during warranty period specified in Supplemental Conditions of Contract.

E28.7 Maintenance Period

- E28.7.1 As specified in E26: Landscape Maintenance.

E28.8 Materials

E28.8.1 Plants – General

- (a) Supply plants conforming to federal and provincial regulations.
- (b) Nursery Grown Plants:
  - (A) All plants shall be No. 1 Grade, nursery grown, under proper cultural practices with respect to fertile soil, ample spacing, regular cultivation, weed, pest and disease control, adequate moisture and pruning in accordance with good horticultural practices as advocated by the Canadian Nursery Trades Association and the Manitoba Landscape Nursery Trades Association.
  - (B) Plants true to type, structurally sound, well balanced, healthy, vigorous, of normal growth habits, densely foliated and healthy well developed root system.
  - (C) Plants free of disease, insect infestations, insect eggs, rodent damage, sun scald, frost cracks and other abrasions or scars to bark.
  - (D) Heeled-in plants or plants from cold storage will no be accepted.
  - (E) Plants which have been top worked, unnaturally sheared or colour treated are not acceptable.

E28.8.2 Plants – Characteristics

- (a) Shrubs: natural form, typical of genus, species and variety; minimum of four canes.

E28.8.3 Plant Measurement

- (a) All plants shall conform to measurements specified in plant list.
- (b) Measure shrubs, in millimetres, with branches in their normal positions.

E28.8.4 Plants - Soil Balls

- (a) Container grown plants:
  - (A) Grown in containers for minimum of three months.
  - (B) Established root system which will "hold" soil when removed from container.
  - (C) Container sized in proportion to plant size.
  - (D) Root-bound plants are not acceptable.

E28.8.5 Planting Mix

- (a) Refer to E10: Topsoil and Finish Grading.

E28.8.6 Water

- (a) Obtain water from new hosebib on site if installed. If hosebib not available Contractor responsible for providing water.

E28.8.7 Plant Accessories

- (a) Mulch: Mulch shall be a clean bark or wood chip from hardwood trees, free of bark, branches and leaves, varying in size from 15-75 mm (2" to 3") by 6-20 mm (1/4"-3/4") thick. Provide sample bag prior to installation for approval.
- (b) Snap Edging:
  - (A) "Snap Edge" plastic edging, complete with steel pegs as manufactured and supplied by Barkman Concrete Ltd. (phone: 204-667-3310), or approved equal.



## E28.9 Execution

### E28.9.1 Preparation

- (a) Locate and stake locations of electrical services, utility lines and other underground obstructions.
- (b) If underground services interfere with planting plan, notify Contract Administrator, stop Work in area and await further instructions.
- (c) Stake out locations of planting beds.
- (d) Protect bench marks and hubs which form part of legal Site survey.

### E28.9.2 Preparation of Shrub Beds

- (a) Excavate minimum of 300 mm deep, scarify bottom to 150 mm depth.
- (b) Place planting mix in planting beds to required elevations.

### E28.9.3 Planting

- (a) Place plants at same depth they were originally grown. Face for best appearance.
- (b) Container plants: remove containers and keep soil ball intact while placing plant in pit.

### E28.9.4 Mulching

- (a) Obtain approval of planting before mulching material is applied. Loosen soil in shrub beds and remove debris and weeds. Spread mulch to minimum thickness of 75 mm as indicated on Drawings. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

### E28.9.5 Maintenance

- (a) Perform maintenance as specified in E26: Landscape Maintenance.

### E28.9.6 Clean-up

- (a) Remove excess materials from Site.
- (b) Leave Site in neat condition.

## E28.10 Method of Measurement and Basis of Payment

E28.11 The supply and planting of shrubs will be measured on a unit basis and paid for at the Contract Unit Price. The quantity to be paid for will be the total number of trees supplied and planted in accordance with this Specification, accepted and measured by the Contract Administrator.

## **E29. SEEDING**

### E29.1 General Description

E29.1.1 This Specification shall cover the supply and installation of seed for areas as specified herein and as indicated on the Drawings, and in accordance with Specification CW 3520-R7 Seeding.

E29.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified and in accordance with CW 3520-R7.

### E29.2 Materials

- E29.2.1 General: All materials shall conform to CW 3520-R7 and this Specification. Where the two do not agree, this Specification shall take precedence.
- E29.2.2 Seed for general park areas, boulevards, medians and interchange areas, as per CW 3520-R7.
- E29.2.3 Hydro Mulching materials as per CW 3520-R7.
- E29.3 Construction Method
  - E29.3.1 Construction method shall conform to CW 3520-R7, including provisions for hydro mulching
- E29.4 Method of Measurement and Basis of Payment
  - E29.4.1 Seeding will be paid for on a square metre basis. Price shall be in full for supplying materials and for performing the Work.
- E30. SODDING**
- E30.1 General Description
  - E30.1.1 This Specification shall cover the supply and installation of sod for areas as specified herein and as indicated on the Drawings, and in accordance with Specification CW 3510-R9 Sodding and SD-243 Sodding Details.
  - E30.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified and in accordance with CW 3510-R9.
- E30.2 Materials
  - E30.2.1 Nursery sod for general park areas and boulevards, as per CW 3510-R9.
- E30.3 Construction Method
  - E30.3.1 Construction method shall conform to CW 3510-R9 and SD-243.
- E30.4 Method of Measurement and Basis of Payment
  - E30.4.1 Sodding will be paid for on a square metre basis. Price shall be in full for supplying materials and for performing the Work.
- E31. LANDSCAPE MAINTENANCE**
- E31.1 General Description
  - E31.1.1 This Specification shall cover the maintenance of trees, shrubs, sod and seeded areas, as specified herein and as indicated on the Drawings, following acceptance of the plant material to start warranty.
  - E31.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
  - E31.1.3 The Contractor shall maintain all areas within the limit of Work as indicated on the Drawings, in accordance with these Specifications, and as directed by the Contract Administrator.
  - E31.1.4 In general, the Work shall include mowing, weed control, and fertilizing.
- E31.2 Maintenance and Guarantee Period

E31.2.1 Maintenance of seed and sod shall occur between the date of installation and up to a period of thirty (30) days from date of the issuance of the Certificate of Substantial Performance, or until turf is established in accordance with CW 3510-R9, for sodded areas and CW 3520-R7 for seeded areas.

E31.2.2 The guarantee period for nursery plant shrubs will be one (1) year.

E31.2.3 The guarantee period for nursery plant trees will be two (2) years.

### E31.3 Materials and Equipment

E31.3.1 Materials shall conform to E10 Topsoil and Finish Grading, E25: Sodding.

E31.3.2 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.

### E31.4 Construction Method

#### E31.4.1 General

- (a) Provide weeding services within 48 hours and re-seeding within five (5) days of the request by the Contract Administrator. Monitor the Site and advise the Contract Administrator of conditions that might void the Contractor's warranty.
- (b) The Contractor shall maintain a log noting times, dates, equipment used, and quantity of materials used and areas treated for each maintenance application. Submit log to Contract Administrator upon request. Contractor shall notify Contract Administrator of the exact time Contractor proposes to commence each application.
- (c) Schedule operations in accordance with growth, health, weather conditions, and use of Site.
- (d) Perform each operation continuously and completely within a reasonable time period.
- (e) Store equipment and materials off Site.
- (f) Collect and dispose of debris or excess material on daily basis.

#### E31.4.2 Mowing

- (a) Do not mow areas seeded with grasses during establishment period.
  - (A) Mow grass at height of 50 - 60 mm, do not allow to grow past 80 mm. Do not cut more than 1/3 of the grass height at any one mowing, unless otherwise directed by the Contract Administrator.
- (b) Do not remove clippings from grassed areas.

#### E31.4.3 Weed Control

- (a) The Contractor shall apply herbicide when broadleaf weeds start developing in competition with grasses.
- (b) Apply herbicide in accordance with manufacturer's instructions and the Manitoba Agriculture Guide to Chemical Weed Control latest edition.
- (c) Use 2.4D Amine or MCPA Amine herbicide for susceptible broadleaf weeds.
- (d) Use a mixture containing 2.4-D Amine or MCPA Amine. Mecoprop and Dicamba for 2.4-D resistant plants.
- (e) Avoid use of pure Dicamba solutions near trees.
- (f) Do not apply to newly seeded turf until after the second mowing, or as directed by the Contract Administrator.
- (g) Do not water within 24 hours after application.
- (h) Apply when winds are less than 20 km/h and air temperature is above 10°C.

#### E31.4.4 Fertilizing

- (a) Apply 2:11 ratio fertilizer at rate of 0.2 kg nitrogen/100 m<sup>2</sup>.

- (b) Apply in early spring as soon as frost is out of ground.
- (c) Make supplementary application of 0.2 kg nitrogen/100 m<sup>2</sup> towards end of August.
- (d) Use mechanical spreading equipment.
- (e) Check calibration to ensure specified rate is spread evenly. Rectify uneven spreading as soon as it becomes apparent. Spread additional fertilizer over areas affected or rake out excess application.
- (f) Water immediately after fertilizing to obtain moisture penetration of 40-50 mm.

E31.4.5 Reseeding

- (a) Overseed areas by means of broadcasting where germination has failed as directed by the Contract Administrator.
- (b) Seed mixes and rates to E24: Seeding.

E31.4.6 Shrub Beds

- (a) Cultivate shrub beds, keep free of weeds. Eliminate perennial grass and weeds and their roots. Apply in early spring as soon as frost is out of ground.
- (b) Water plants weekly; apply sufficient water to saturate root zone. Use mechanical spreading equipment.
- (c) Areas with no irrigation system: supply labour, all hoses and attachments necessary to provide adequate watering. Water immediately after fertilizing to obtain moisture penetration of 40-50 mm.
- (d) Obtain water from new hosebib on site if installed. If hosebib not available Contractor responsible for providing water.
- (e) Maintain mulch to depth of 75 mm.

E31.5 Extension of Maintenance Period

- E31.5.1 At the end of the maintenance period, all sodded and seeded areas must show signs of growth satisfactory to the Contract Administrator and in accordance with E24: Seeding and E25: Sodding.
- E31.5.2 Unsatisfactory areas shall be replaced and maintained by and at the expense of the Contractor, to the satisfaction of the Contract Administrator.
- E31.5.3 Warranty for any replaced nursery plant material, shall be extended a full year from date of acceptance of the replaced plants.

E31.6 Method of Measurement and Basis of Payment

- E31.6.1 No separate measurement or payment shall be made for Landscape Maintenance. This Work shall be incidental to Seeding and Sodding.

**E32. SITE FURNITURE**

E32.1 General Description

- E32.1.1 This Specification shall cover the supply and installation of Benches, Waste Receptacles, Bike Racks, and Boulders as called for on the drawings. The Contractor shall furnish all labour, materials, equipment and services necessary to complete the Work as shown and specified herein.
- E32.1.2 This Specification shall cover the pick up and installation of Picnic Tables and Accessible Picnic Tables as called for on the drawings. The Contractor shall furnish all labour, materials, equipment and services necessary to complete the Work as shown and specified herein.
- E32.1.3 The work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools,

supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as specified herein.

## E32.2 Materials

E32.2.1 All materials supplied under this specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

- (a) Benches: Four (4) Cascades Contour Benches, 72" long, walnut brown recycled plastic (#235), with in-ground mounting and two (2) galvanized armrests, or approved equal in accordance with B6.
- (b) Waste Receptacle: Two (2) Cascades Contour Trash Receptacles, steel structure with walnut brown recycled plastic (TR5), with in-ground mounting, or approved equal in accordance with B6.
- (c) Picnic Table: One (1) Tache Style galvanized metal frame picnic table, as per SCD-130, product #52501108 with duckbill anchors or approved equal in accordance with B6. Table to be painted same colour as specified for benches. There will be no cost for the supply of the picnic table; only to pick-up and install.
- (d) Accessible Picnic Table: One (1) Tache Style Wheelchair galvanized metal frame picnic table, as per SCD-130A, product #52501108 with duckbill anchors or approved equal in accordance with B6. Table to be painted same colour as specified for benches. There will be no cost for the supply of the picnic table; only to pick-up and install.
- (e) Bike Rack: One (1) Madrax Gridrac bike rack, 4-bike capacity, galvanized finish, with in-ground mounting.
- (f) Boulders: Fourteen (14) boulders, smooth granite erratic size to vary from 450 to 610mm (1.5' to 2.4'). Colour grey to dark grey with quartz inclusions. Provide stone sample for Contract Administrator prior to transporting material to the construction site.
- (g) Contact for Benches & Waste Receptacles:
  - Playgrounds-R-U's
  - 250 Transport Road
  - Box 7, Grp. 582, R.R. #5
  - Winnipeg, MB R2C 2Z2
  - Ph: (204) 632-7000
  - Fax: (204) 632-7421
- (h) Contact for Picnic Tables & Accessible Picnic Tables:
  - Carl Woloshyn (986-3835) and/or Brian Mayer (470-7747)
  - Centralized Park Services
  - City of Winnipeg
  - 825 Taché Avenue
  - Email: [CWoloshyn@winnipeg.ca](mailto:CWoloshyn@winnipeg.ca)
  - Email: [BMayer@winnipeg.ca](mailto:BMayer@winnipeg.ca)
- (i) Contact for Bike Racks:
  - Crozier Agencies
  - 8-1865 Sargent Avenue
  - Winnipeg, MB R3H 0E4
  - Ph: (204) 774-6084

Fax: (204) 774-6099

### E32.3 Construction Methods

#### E32.3.1 Furnishings and Fixtures:

- (a) All fixtures and furnishings are to be installed as per manufacturer's instructions.
- (b) All furnishings and fixtures to be installed plumb and true to correct elevations and location, as directed by the Contract Administrator. The Contractor shall confirm proposed locations of all site furnishings with Contract Administrator prior to installation.
- (c) All furnishings and fixtures to be carefully handled so that no parts will be bent, broken, or otherwise damaged. Hammering, which will injure or distort fixture, is prohibited.

#### E32.3.2 Boulders:

- (a) Boulders: Smooth granite erratic size to vary. Colour white, grey to dark grey with quartz inclusions.
- (b) Provide stone sample for Contract Administrator and owner approval prior to transporting material to the construction site.
- (c) Stake boulder locations on site per L-2.1 & L-4.1 and obtain approval of Contract Administrator.
- (d) Do not excavate below the typical 150mm for boulders in any location.
- (e) Prepare base and subgrade as indicated in Detail 1/L-6.1.
- (f) Install boulders in a flush, true and stable position prior to installing surrounding finished surface and/or vegetation.
- (g) Obtain approval of boulder installation from Contract Administrator.

### E32.4 Method of Measurement and Basis of Payment

- E32.4.1 Measurement and payment shall be for each as per Form B: Prices. Said price shall include all Work necessary to supply and install each item of Site Furniture.

## **E33. PLAY EQUIPMENT**

### E33.1 General Description

- E33.1.1 This specification shall cover the supply and installation of Play Equipment as specified herein.
- E33.1.2 The Contractor shall furnish all labour, materials, equipment and services necessary to complete the Work according to specifications.
- E33.1.3 This specification shall cover the supply and installation of: one (1) KOMPAN Moments Triple Shifter as specified herein.
- E33.1.4 The Play Equipment shall be installed in the available area as shown on the Drawings. Components and their safety zones must fit into the proposed play areas as shown on Drawing L-4.2.

### E33.2 Products

- E33.2.1 KOMPAN Moments Triple Shifter, Model M7021P, 4'10" height, as depicted on the attached Drawings.

- (a) Contact for KOMPAN Moments Triple Shifter

Jeff Kuby

PlayWorks, Inc.  
12824 141 St.  
Edmonton, AB T5L 4N8  
Ph: (204) 414-2990

### E33.3 Materials

- E33.3.1 All materials shall be structurally sound and suitable for safe play. Durability shall be ensured on all parts and materials.
- E33.3.2 There shall be a minimum (or no) amount of hollow plastic components. Solid plastic is acceptable.
- E33.3.3 Fasteners
- (a) All hardware shall be tamper-proof in design and requiring special tools. It shall be either carbon steel plated with zinc/nickel and iridescent chromate finish or stainless steel. All necessary hardware and tools shall be provided.
- E33.3.4 Finishes
- (a) Finishes shall meet or exceed ASTM standards for hardness, adhesion, impact and salt spray resistance. All fabrication cuts, drill holes, and weld joints shall be sprayed with a corrosion resistant coating.
- E33.3.5 Concrete Foundations
- (a) Post shall be installed into a concrete footing the composition of which is detailed in E29: Foundations.

### E33.4 Installation

- E33.4.1 Play Equipment
- (a) Play equipment shall be installed as per manufacturer's specifications and in accordance with the most recent Canadian Standards Association Standards.
- (b) All posts and other vertical items shall be plumb and true to vertical, if so designed.

### E33.5 Method of Measurement and Basis of Payment

- E33.5.1 Method of Measurement shall be as follows:
- (a) Play Equipment shall be measured on a per unit basis for the following:
- (A) "Supply and Install KOMPAN Triple Shifter Play Equipment".
- E33.5.2 Basis of Payment shall be as follows:
- (a) Play equipment will be paid for at the Contract Unit Prices. The amount to be paid for shall be the total number of units, as indicated on Form B: Prices. This price shall be full payment for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work and as accepted by the Contract Administrator.

## E34. FOUNDATIONS

### E34.1 General Description

- E34.1.1 All playground equipment posts, bases and anchors are to be set in concrete footings or piles to ensure stability and prevent frost heaving. Specification CW 2160-R7 Concrete to be Used in Underground Works is to be utilized in the installation of the concrete works for all below ground components.

### E34.2 Materials

- E34.2.1 The specific concrete requirements shall be:

- (a) Sulfate resistant, Type 50 Cement;
- (b) 28 day compressive strength of 30 Mpa;
- (c) maximum aggregate size of 20mm, nominal;
- (d) slump 80 +/- 20mm;
- (e) maximum water/cement ratio 0.49.

**E34.3 Installation**

E34.3.1 All posts and supports shall be centred in the concrete footing such that there is a complete collar of concrete around each post and support. Where posts are not perfectly centred there should be a minimum of 2" concrete at any point around the post.

E34.3.2 All concrete footings for play equipment shall be a **minimum of 3' depth**, or in accordance with Manufacturer's specifications, whichever is greater.

**E34.4 Method of Measurement and Basis of Payment**

E34.4.1 Method of Measurement shall be as follows:

- (a) Foundations shall be incidental to the measurement of Play Equipment listed in E29 and as shown on Form B: Prices.

E34.4.2 Basis of Payment shall be as follows:

- (a) No separate payment shall be made for play equipment foundations.

**E35. MAINTENANCE KITS**

E35.1 All play equipment shall include the supply of maintenance kits. Maintenance kits shall include maintenance manuals, complete manufacturer's parts lists, touch-up paint, PVC repair paint, 10% extra of each bolt, washer and any other hardware utilized on the play equipment, and all special tools necessary for assembly and maintenance.

E35.2 There shall be no payment for maintenance kits.

**E36. POURED RUBBER SAFETY SURFACING**

**E36.1 Description**

E36.1.1 This Specification shall cover the supply and installation of Poured Rubber Safety Surfacing within the play area.

E36.1.2 This Specification shall cover the supply and installation of Poured Rubber Safety Surfacing to sheet drain as per Drawing L3.1.

**E36.2 Materials**

E36.2.3 Poured Rubber Safety Surfacing product shall be either Game Time GT Impax Poured Recycled Rubber Surfacing or Softline Pour In Place Safety Surface System or substitute acceptable to Contract Administrator.

- (a) Contact for Game Time GT Impax Poured Recycled Rubber Surfacing

Crozier Agencies  
8-1865 Sargent Avenue  
Winnipeg, MB R3H 0E4  
Ph: (204) 774-6084  
Fax: (204) 774-6099

- (b) Contact for Softline Pour In Place Safety Surface System



Softline Solutions  
 455 Lucas Avenue  
 Winnipeg, MB R3C 2E6  
 Ph: (204) 942-4543  
 Fax: (204) 633-3133

E36.2.4 Poured Rubber Safety Surfacing product shall consist of:

- (a) Primer and Binder:
  - (A) 100% polyurethane binding agent; and
  - (B) MDI (methyl dephenyl isocyanate) binder.
- (b) Impact Course:
  - (A) SBR (styrene butadiene rubber); and
  - (B) low density rubber base and binder.
- (c) Wear Course:
  - (A) 1-3mm ø EPDM (ethylene propylene diene monomer); and
  - (B) pigmented synthetic rubber granules and binder

E36.2.5 Poured Rubber Safety Surfacing product properties:

- (a) ASTM D412: Tensile Strength – 60 PSI min.
- (b) ASTM D412: Elongation and break – 140% min.
- (c) ASTM D2859: Flammability – Pass
- (d) ASTM D204: Coefficient of friction; wet – 0.9 mi, dry – 1.0 min.
- (e) Water permeability 0.4 gal/ sq.yd/sec., min.

E36.2.6 Consumer product safety commission (CPSC) and ASTM 1292-99 fall height requirements based on total system thickness of impact course and wear course:

FALL HEIGHT	SYSTEM THICKNESS
1210mm (4')	38mm (1.5")
1829mm (6')	64mm (2.5")
2438mm (8')	83mm (3.5")
3048mm (10')	114mm (4.5")
3657mm (12')	140mm (5.5")
4267mm (14')	165mm (6.5")

E36.2.7 Provide colour sample for final approval 2 weeks prior to pouring rubber. Install 1x1m sample section of rubber to set standard of acceptance.

**E36.3 Construction Method**

E36.3.1 Obtain Contract Administrator approval of adjacent concrete edges prior to commencing rubber installation.

- (a) Play equipment shall be installed as per manufacturer's specifications and in accordance with the most recent Canadian Standards Association Standards.

**E36.3.2 Installation of poured rubber safety surfacing shall be installed by a experienced, certified rubber installer that has completed at least three installations in sites of similar climate to Winnipeg. Provide certification prior to commencing work.**

E36.3.3 Install play equipment in rubber areas prior to commencing rubber installation.

- E36.3.4 Shape subgrade and ensure positive drainage towards street.
  - E36.3.5 Coordinate with play equipment supplier to confirm all safety zones and play equipment fall height rubber depth requirements. Depth standards as indicated above.
  - E36.3.6 Install base course per Specifications ensuring base course allows for the appropriate depth of rubber required under the play equipment.
  - E36.3.7 Obtain Contract Administrator's approval of base and compaction test results prior to installing rubber safety surface.
  - E36.3.8 Do not install rubber when overnight temperature will fall below 5° Celsius (40°F).
  - E36.3.9 Install rubber base and wear course per manufacturer's written specifications to required depths for associated safety zones and to the profiles and connections indicated on the Detail 4/L-6.2.
  - E36.3.10 Obtain Contract Administrator's approval of rubber installation. Repair any deficiencies noted immediately.
  - E36.3.11 Conduct an impact attenuation test through a certified laboratory. Provide test results to confirm installed poured rubber safety surfacing meets the requirements of ASTM F-1292-99 and ASTM 1292-96. Rubber surfacing will not be accepted until test results are submitted and approved by the City of Winnipeg.
  - E36.3.12 Provide a 5-year written warranty for poured rubber safety surfacing product, a 10-year written warranty for workmanship, independent laboratory test results and a material maintenance manual to the owner prior to final acceptance of the safety surface installation.
- E36.4 Method of Measurement and Basis of Payment
- E36.4.1 Method of Measurement shall be as follows:
    - (a) Poured Rubber Safety Surfacing will be measured on a square metre basis for Item 9: "Poured Rubber Safety Surface Supply/Install" on Form B: Prices.
  - E36.4.2 Basis of Payment shall be as follows:
    - (a) Poured Rubber Safety Surfacing will be paid for at the Contract Unit Prices. The amount to be paid for shall be the total number of units, as indicated on Form B: Prices. This price shall be full payment for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work and as accepted by the Contract Administrator.

## **E37. COMMON WORK RESULTS – ELECTRICAL**

- E37.1 Summary
  - E37.1.1 Section Includes: General requirements that are common to the Electrical Contractor.
  - E37.1.2 This Section covers items common to the Electrical Contractor.
  - E37.1.3 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
  - E37.1.4 Carefully examine all plans and specifications pertaining to this Contract and become familiar with all details. Visit the site and determine all factors affecting this section of the work and include all costs for same in Bid Opportunity.

## E37.2 References

- E37.2.1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- E37.2.2 The electrical installation shall comply with the requirements of the Electrical Supply Authority, the latest edition of the Canadian Electrical Code, with all Provincial and Municipal Laws, Rules and Ordinances, and to the satisfaction of those persons having jurisdiction over same.
- E37.2.3 Notify Contract Administrator of any discrepancies or conflicts with any regulation seven (7) working days before tenders close. Failing such notification, meet all such requirements without change to the Contract price.
- E37.2.4 In no instance shall the standard established by these specifications and drawings be reduced by any of the codes, rules or ordinances.

## E37.3 Design Requirements

- E37.3.1 Operating voltages: to CAN3-C235.
- E37.3.2 Language operating requirements: provide identification nameplates for control items in English, unless otherwise indicated.

## E37.4 Submittals

- E37.4.1 Submit Shop Drawings, produce detailed data and samples in accordance with previous sections, as specified herein, and to Contract Administrator's satisfaction.
- E37.4.2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
- E37.4.3 Where applicable, include actual wiring, single line and schematic diagrams. Include all technical data and full details of each component.
- E37.4.4 Shop drawings of all equipment must be submitted to the Contract Administrator for review in sufficient time to enable him to retain them for at least ten (10) working days.
- E37.4.5 Cross out or eradicate all non-related items.
- E37.4.6 The Electrical Contractor shall check all Shop Drawings and make necessary changes, or cause the supplier to make necessary changes, prior to submission to the Contract Administrator. Shop Drawings will be reviewed by the Contract Administrator and if re-submission is required, Electrical Contractor shall ensure that the supplier's Drawings have been changed to comply before returning them to the Contract Administrator for review again.
- E37.4.7 Review of the shop drawings by the Contract Administrator shall not relieve the Contractor from responsibility for errors and omissions therein.
- E37.4.8 Each drawing submission to bear the following signed stamp, and shall include name of project, equipment supplier, and clause number equipment is specified under.

### CONTRACTORS CERTIFICATION

This drawing has been reviewed by  
(firm name)

All dimensions have been checked and found compatible  
with the contract drawings and all capacities, quantities,

sizes, and other data contained in the contract documents have been listed by the supplier on this drawing and have been checked by the undersigned and found correct.

Date: Per:

- E37.4.9 Main distribution and utility metering shop drawings must be approved by local utility prior to submission to Contract Administrator.
- E37.4.10 Incomplete submissions will be returned for updating and re-submittal without Contract Administrator's review.
- E37.4.11 Quality Control: in accordance with this contract.
- .1 Provide CSA or equivalent certified equipment and material.
  - .2 Where CSA or equivalent certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to Site
  - .3 Submit test results of installed electrical systems and instrumentation.
  - .4 Permits and fees: in accordance with General Conditions of Contract.
  - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work.
- E37.4.12 Manufacturer's Field Reports: submit manufacturer's written reports, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in Field Quality Control.
- E37.5 Quality Assurance
- E37.5.1 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction and as per the conditions of Provincial or Territorial Act respecting manpower vocational training and qualification.
- E37.6 Delivery, Storage and Handling
- E37.6.1 Material Delivery Schedule: provide Contract Administrator with schedule within 2 weeks after Award of Contract.
- E37.6.2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling.
- E37.7 System Startup
- E37.7.1 Upon completion of the project, demonstrate the operation, care and maintenance of all system equipment and components in the presence of the Owner, or his representative, and the Contract Administrator. Obtain signed certification from the Owner that such equipment was shown to be fully operational and that all necessary operating instructions have been provided.
- E37.7.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.
- E37.8 Drawings
- E37.8.1 Carefully examine all Drawings and Specifications relating to all Work, and all electrical Work indicated thereon shall be considered as a part of the Work by this section unless indicated otherwise. Prior to the date of the last addendum report at once to the Contract Administrator, any defect, discrepancy, omission or interference affecting the Work of this section, or the guarantee of same.

- E37.8.2 Install all equipment as shown or as specified and in accordance with manufacturer's approved Shop Drawings.
- E37.8.3 The drawings accompanying these Specifications are intended to show the general arrangement and extent of the Work to be carried out, but the exact location and arrangement of all parts shall be determined as the Work progresses. The location of equipment, outlets, etc., as given on the Drawings are approximately correct, but it shall be understood that they are subject to such modifications as may be found necessary or desirable at the time of installation to meet any structural or Contract Administrator requirements. Such changes shall be implemented as directed by the Contract Administrator, without additional charge.
- E37.8.4 Electrical Drawings do not show all structural and other details. Contract Administrator and structural conditions shall govern, and this Section shall make without charge, changes or additions to accommodate these conditions. Check all Contract Administration plans, elevations and details for location of electrical devices, equipment and equipment to be connected.
- E37.8.5 Where Drawings indicate the general location and route to be followed by conduit, cable, etc., these locations must be governed by job conditions.
- E37.8.6 Submit a complete set of Drawings for the proposed installation to the Inspection Department having jurisdiction and receive written approval before installation or fabrication of any equipment. No extra compensation will be allowed for any changes or rearrangement of any electrical apparatus or materials necessary due to failure to receive this approval.
- E37.9 Operation and Maintenance Data
- E37.9.1 Provide operation and maintenance data for incorporation into operation and maintenance manuals specified.
- E37.9.2 Include in operations and maintenance data:
- .1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension, and expansion of any portion or feature of the electrical installation.
  - .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature alone is not acceptable.
  - .3 Wiring and schematic diagrams and performance curves.
  - .4 Names and addresses of local suppliers.
  - .5 Copy of reviewed shop drawings.
- E37.9.3 Provide five (5) complete, hard-backed, D-ring loose leaf Maintenance Manuals. These shall consist of typewritten or printed instructions for operating and maintaining all systems and equipment provided under this section of the Specification. Manuals shall also contain Shop Drawings, wiring diagrams, test results and manufacturer's brochures on all equipment, together with typed index tab sheets.
- E37.9.4 As Work progresses, record on one (1) set of contract Drawings, installed conduit layout as well as any approved changes and deviations from the original Contract and/or Working Drawings, including outlets, equipment and panel locations. At completion of Work, submit to the Contract Administrator, at the Contractor's costs, reproducible mylar Record Drawings. The Contract shall not be considered complete and no final payment shall be made until these Drawings are accepted by the Contract Administrator.

- E37.9.5 Reproducible sepias of Record Drawings are to be mylar (diaz coated plastic film).
- E37.10 Temporary Lighting and Power
- E37.10.6 All temporary and construction lighting and power Work and costs for same are not included as part of the scope of the work of this section. Refer to such clauses in other sections of the Specification.
- E37.11 Examination of Documents and Site
- E37.11.1 Carefully examine all plans and Specifications pertaining to this Contract and become familiar with all details. Visit the Site and determine all factors affecting this section of the Work; include all costs for same in Bid Opportunity.
- E37.12 Materials and Equipment
- E37.12.1 All Materials, equipment and articles incorporated in the Work are to be exactly as specified, or as approved by the Contract Administrator.
- E37.12.2 In every case the responsibility of sustaining that the proposed substitute Material is equivalent to the Material specified rests with the person or persons making application for approval and not with the Contract Administrator.
- E37.12.3 If there is a question as to whether any product or system is in conformance with applicable standards, the Contract Administrator reserves the right to have such products or systems tested to prove or disprove conformance.
- E37.12.4 The cost for such testing shall be borne by The City in the event of conformance with the Contract Documents or by the Contractor in the event of non-conformance.
- E37.12.5 Equipment and material to be CSA certified or certified by an equivalent recognized certifying agency to meet Canadian Standards. Where there is no alternative to supplying equipment which is certified, obtain special approval from local Electrical Inspection Department or authority having jurisdiction.
- E37.12.6 Factory assemble control panels and component assemblies.
- E37.12.7 Submit for Contract Administrator's approval, a duplicate list of makes and types of all equipment and materials for this project, prior to placing of orders for same. This shall be done within fourteen (14) days of the award of the project Contract to the General Contractor in order to avoid delays in delivery and completion.
- E37.12.8 Any material or equipment ordered or installed without the Contract Administrator's prior approval shall, if so directed by the Contract Administrator, be removed and replaced with approved material or equipment without a change in the Contract price.
- E37.13 Warning Signs
- E37.13.1 Warning Signs: in accordance with requirements of authority having jurisdiction and Contract Administrator.
- E37.13.2 Decal signs, minimum size 175 x 250 mm.
- E37.13.3 Provide "Danger High Voltage" labelling on main electrical room door.
- E37.14 Wiring Terminations
- E37.14.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for type of conductors used.
- E37.15 Equipment Identification

E37.15.1 Identify electrical equipment with nameplates and labels as follows, and as indicated in other specification sections:

- .1 Nameplates: lamicooid 3mm thick plastic engraving sheet, white face with black core (white with black letters) lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
- .2 Sizes as follows:

NAMEPLATE SIZES

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

E37.15.2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise

E37.15.3 Wording on nameplates and labels to be approved by Contract Administrator prior to manufacture.

E37.15.4 Allow for minimum of twenty-five (25) letters per nameplate and label.

E37.15.5 Nameplates for terminal cabinets and pullboxes: Indicated system and voltage.

E37.15.6 Disconnects, starters and contactors: indicate equipment being controlled and voltage

E37.15.7 All convenience receptacles shall have a lamacoid size 1 plate on which the panel and circuit number from which it is fed, is indicated. The identification shall be mechanically secured to the coverplate on the appropriate outlet. Pressure indented adhesive strip nameplates are not acceptable and shall not be used.

E37.16 Wiring Identification

E37.16.1 Identify wiring with permanent indelible identifying markings on both ends of phase conductors of feeders (coloured plastic tapes) and branch circuit wiring (numbered wire markers). Conductor marker identification shall correspond with panel or terminal board directory information.

E37.16.2 Maintain phase sequence and colour coding throughout.

E37.16.3 Colour coding: to CSA C22.1.

E37.16.4 Insulated grounding conductors shall have a green finish and shall be used only as a grounding conductor.

E37.17 Finishes

E37.17.5 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

- .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.

E37.18 Workmanship and Materials

E37.18.1 The installation shall consist of material and equipment specified unless as provided herein. Electrical equipment provided under this contract shall be built in accordance with EEMAC standards and shall be C.S.A. certified (or certified by an equivalent recognized certifying agency to meet Canadian Standards)

and/or locally approved. All equipment supplied under this contract shall be new and the best of its respective kind and of uniform pattern throughout.

E37.18.2 Any material or equipment ordered or installed without the Contract Administrator's prior approval shall, if so directed by the Contract Administrator, be removed and replaced with approved material or equipment without a change to the Contract.

E37.18.3 Replace inferior Work if so ordered by Contract Administrator without a change to the Contract.

E37.18.4 Retain same foreman or superintendent on the job until completed, unless otherwise directed by the Contract Administrator.

#### E37.19 Request Equal

E37.19.1 Applications for approval of equal, or alternate materials, or methods, as substitutions for those specified or shown, shall be submitted to the Contract Administrator not later than five (5) Working days before Bid Opportunities are due. If approval is to be granted, the Contract Administrator will reply prior to the closing of Bid Opportunities. Request shall be in writing, in duplicate, and shall be accompanied by a self-addressed stamped envelope.

E37.19.2 If an "Equal" has been granted, the choice between the materials or methods specified and those approved as equal shall be optional with this Contractor.

E37.19.3 If an "Alternate" has been approved, the difference in cost between this alternate and the specified material or method shall be stated in the Bid Opportunity as an "add to" or "delete from" the Bid Opportunity price and the choice of materials or methods shall rest with the Contract Administrator.

E37.19.4 Costs for any required additional material, wiring and labour due to the granted equal or approved alternate shall be included in the Bid Opportunity or alternate price. This shall include costs which are incurred by other Divisions of this specification

E37.19.5 Any request for equal shall include the following:

- .1 Catalogue information, all technical data, full detail and size of the proposed equipment and all components.
- .2 Any information requested in the related Specification section.
- .3 Photometric Data for light fixtures.

#### E37.20 Wiring Terminations

E37.20.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

#### E37.21 Installation

E37.21.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

E37.21.2 Do overhead and underground systems in accordance with CSA C22.3 No. 1 except where specified otherwise.

#### E37.22 Nameplates and Labels

E37.22.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

#### E37.23 Mounting Heights



E37.23.1 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

#### E37.24 Field Quality Control

E37.24.1 Conduct following tests in accordance with this contract.

- .1 Power distribution system including phasing, voltage, grounding and load balancing.
- .2 Circuits originating from branch distribution panels.
- .3 Lighting and its control.

E37.24.2 All circuits shall be tested to ensure that the circuit numbers are correct and that the proper neutral conductors have been provided and installed.

E37.24.3 Carry out tests in presence of Contract Administrator and Owner.

E37.24.4 Advise Contract Administrator of dates and times for all testing with sufficient advance notice to allow Contract Administrator to make arrangements to attend.

E37.24.5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

E37.24.6 Insert test results and supplier's certifications in Maintenance Manuals.

#### E37.25 Cleaning

E37.25.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

E37.25.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

#### E37.26 Permits, Fees and Inspection

E37.26.1 Submit to Electrical Inspection Department and Supply Authority necessary number of Drawings and Specifications for examination and approval prior to commencement of Work.

E37.26.2 Pay all associated fees for inspection of the Work by authorities having jurisdiction.

E37.26.3 Notify Contract Administrator of changes required by Electrical Inspection Department prior to making changes.

E37.26.4 Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to Consultant. Copies to be included in Maintenance Manuals.

#### E37.27 Responsibility

E37.27.1 Be responsible for any damage caused the Owners, or their Contractors due to improperly carrying out this Work.

E37.27.2 Install all components of this Work promptly and where applicable, in advance of concrete pouring, or similar construction. Provide and set in the proper sequence of construction, all sleeves, hangers, inserts, etc. and arrange for all necessary openings, where required to accommodate the electrical installation.

E37.27.3 Work shall be arranged in co-operation with other divisions of this Specification in such a manner that it doesn't interfere with the progress of the project. In areas where ducts or pipes must be installed along with conduit or cable, co-operate with other divisions so that the finished job will represent the most efficient use of the space.

E37.27.4 In no case proceed with any Work in uncertainty. Obtain, from the Contract Administrator, any clarification necessary and thoroughly understand all portions of the Work to be performed.

#### E37.28 Cleanliness and Cleaning

E37.28.1 This division shall maintain a clean tidy job Site. All boxes, crates, and construction debris due to this portion of the Work shall be neatly piled outside the construction area and shall be removed at least weekly during the construction period. All construction areas shall be kept clear of debris.

E37.28.2 Before the project will be accepted by the City, all lighting fixtures, lamps, lens, panelboards, switches, receptacles, cover plates, and other electrical equipment shall be clean and free of dust, plaster, paint, etc. Any equipment which is scratched or damaged shall be refinished or replaced if so designated by the Contract Administrator.

#### E37.29 Modifications

E37.29.1 Locations of all light fixtures, convenience receptacles, outlets, etc. are subject to modification by the Contract Administrator, who reserves the right to move these up to 3000 mm from the position shown, without change to the Contract price, provided notice is given before the related Work has commenced.

#### E37.30 Engineering Observations

E37.30.1 The term "Contract Administrator" in all electrical sections of specification shall mean:

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E37.30.2 Contractor's work will be observed periodically by Owner / Contract Administrator or their representatives, solely for purpose of determining general quality of Work, and not for any other purpose. Guidance will be offered to Contractor in interpretation of plans and specifications to assist him to carry out work. Observation and directives given to Contractor does not relieve Contractor and his agents, servants and employees of their responsibility to erect and install Work in all its parts in a safe and workmanlike manner, and in accordance with plans and Specifications, nor impose upon City, and/or Contract Administrator or their representatives, any responsibility to supervise or oversee erection or installation of any work.

E37.30.3 Contractor shall notify Contract Administrator for a final distribution inspection prior to energizing distribution system. All distribution equipment shall be left with covers removed to allow a thorough inspection.

#### E37.31 Guarantee

E37.31.1 Guarantee the satisfactory operation of all Work and equipment supplied and installed as a part of this section of the Specifications.

E37.31.2 Replace forthwith, at no additional material or labour cost, any part which may fail, or prove defective within a period of twelve (12) calendar months after the final acceptance of the complete installation, provided that such failure is not due to improper usage, or ordinary wear and tear.

E37.31.3 No certificate given, payment made, partial or entire use of the equipment by the City or his representative shall be construed as acceptance of defective workmanship or materials.

E37.31.4 This general guarantee shall not act as a waiver of any specified guarantee or special equipment guarantees covering a greater length of time.

#### E37.32 Excavation and Backfilling

E37.32.1 Excavate and backfill as required for underground electrical services as indicated. Provide protective materials around and over services and be present at all times during excavation and backfilling to supervise Work. Backfilling shall restore the excavated area to the original condition and shall include sodding or asphalt repair where required.

E37.32.2 Work to be in accordance with the current CSA Bulletin.

E37.32.3 Include all costs for excavation and backfilling, for any underground electrical installation unless otherwise indicated.

#### E37.33 Security Fasteners and Hardware

E37.33.1 Electrical Contractor to install security fasteners required for Electrical work.

E37.33.2 This shall also include security tamperproof screws that are exposed such as in light fixtures, coverplates, system devices, outlet covers, etc.

E37.33.3 Refer to other sections of the Specifications for security hardware.

#### E37.34 Protection

E37.34.1 Protect exposed live equipment during construction for personnel safety.

E37.34.2 Shield and mark live parts "LIVE 120 VOLTS", or with an appropriate voltage in English.

#### E37.35 Scheduling of Work

E37.35.1 Existing buildings will remain in use during construction. Arrange Work so that interruption of services is kept to a minimum. Obtain permission from City prior to cutting into electrical services. Where deemed necessary by Contract Administrator, temporary electrical shall be installed and/or work shall be carried out at night and on weekends.

#### E37.36 Testing

E37.36.1 Test all circuits and wires for continuity, insulation resistance and high impedance grounds. Those circuits which test non-continuous, with an insulation resistance less than 2 Megohms or with high impedance grounds shall be replaced.

E37.36.2 Test all required ground rods for ground resistance, with standard test equipment.

E37.36.3 Keep a record of all final test, bind, and turn over typewritten results to the Contract Administrator as part of the maintenance manual. All final test values measured, date of each measurement, company name and signature of person making each measurement shall be neatly recorded. After all tests have been successfully completed, each test report shall contain a summary which clearly states that all results were satisfactory.

E37.36.4 Upon completion of the Work and adjustments of all equipment, all systems shall be tested in the presence of the Contract Administrator to demonstrate that all equipment furnished and installed or connected as part of this section of the Contract shall function electrically in the required manner as determined by the Contract Administrator.

E37.36.5 All circuits shall be tested to ensure that the circuit numbers are correct and that the proper neutral conductors have been provided and installed.

## **E38. WIRE AND BOX CONNECTORS 0-1000V**

### **E38.1 Summary**

E38.1.1 Section Includes: Materials and installation for wire and box connectors.

### **E38.2 References**

E38.2.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-C22.2No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2No.65, Wire Connectors.

E38.2.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

E38.2.3 National Electrical Manufacturers Association (NEMA).

### **E38.3 Materials**

E38.3.1 Pressure type wire connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors as required.

E38.3.2 Fixture type splicing connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

E38.3.3 Clamps or connectors for armoured cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2No.18.

### **E38.4 Installation**

E38.4.4 Remove insulation carefully from ends of conductors and:

.1 Install pressure type wire connectors and tighten according to manufacturers recommendations.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2No.65.

.3 Install fixture type connectors and tighten. Replace insulating cap.

.4 Install bushing stud connectors in accordance with EEMAC 1Y-2 NEMA.

## **E39. WIRES AND CABLES (0-1000 V)**

### **E39.1 Related Sections**

E39.1.1 E33 - Wire and Box Connectors - 0 - 1000 V.

### **E39.2 References**

E39.2.1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.

E39.2.2 CAN/CSA-C22.2 No. 131, Type TECK 90 Cable.

### **E39.3 Submittals**

E39.3.1 Submit product data in accordance with Section E32 - Common Work Results - For Electrical.

### **E39.4 Building Wires**

- E39.4.1 Conductors: stranded for 10 AWG and larger. Size as indicated. Minimum size: 10 AWG.
- E39.4.2 Copper conductors: size as indicated, with minimum 600 V insulation of chemically cross-linked thermosetting polyethylene material rated and RWU90.
- E39.5 General
  - E39.5.1 All branch circuit wiring and conduit shall be installed to minimize voltage drop. Install additional conduit runs as required to take the most direct and shortest route to outlets, light fixtures, etc.
- E39.6 Installation of Building Wires
  - E39.6.1 Install wiring as follows:
    - .1 In conduit systems.
    - .2 In underground ducts.
- E39.7 Installation in Equipment
  - E39.7.1 Group and lace-in neatly wire and cable installed in switchboards, panelboards, cabinets, wireways and other such enclosures.
- E39.8 Terminations
  - E39.8.1 Terminate wires and cables with appropriate connectors in an approved manner.
  - E39.8.2 Compression adapters intended to terminate larger feeders on small lugs are not acceptable. All lugs, including breaker lugs, are to be sized to accommodate the cable being terminated.
- E39.9 Identification
  - E39.9.1 Wire in conduit #2 AWG and smaller shall have solid coloured insulation, color coded as listed below.
  - E39.9.2 Wire in conduit 1/0 AWG and larger and single conductor cables for normal power feeders shall be identified at each outlet box and termination with a 150 mm band of coloured vinyl tape of the appropriate colour. Emergency power feeders shall be provided with an additional 75 mm band of red vinyl tape installed adjacent to the 150 mm band of the coloured phase identification tape, as listed below. Neutral and ground conductors shall be identified. Paint or other means of colouring the insulation shall not be used.
  - E39.9.3 Colour code wire in conduit and single conductor cables as follows:
    - Phase A – red
    - Phase B – black
    - Phase C – blue
    - Neutral – white
    - Ground - green
  - E39.9.4 Maintain phase sequence and colour coding throughout project.
  - E39.9.5 Use colour coded wires in communication cables, matched throughout system.

## **E40. GROUNDING - SECONDARY**

### **E40.1 Related Sections**

E40.1.1 E32 - Common Work Results – For Electrical

### **E40.2 References**

E40.2.1 Canadian Standards Association, (CSA International)

### **E40.3 Equipment**

E40.3.1 Grounding conductors: system, circuit and equipment, grounding to be bare (or green insulated if indicated/required) stranded copper sized in accordance with the Canadian Electrical Code.

E40.3.2 Rod electrodes: galvanized steel 19 mm dia by 3 m long. Threaded to accept 3m extensions where required to achieve adequate grounding.

E40.3.3 Ground conductors: bare stranded copper, tinned, soft annealed, size as indicated.

E40.3.4 Insulated grounding conductors: green, type RW-90.

E40.3.5 Non-corroding accessories necessary for grounding system, type, size, Material as indicated, including but not necessarily limited to:

- .1 Grounding and bonding bushings.
- .2 Protective type clamps.
- .3 Bolted type conductor connectors.
- .4 Thermit welded type conductor connectors.
- .5 Bonding jumpers, straps.
- .6 Pressure wire connectors.
- .7 Grounding or bonding clamps. All grounding and bonding clamps shall be brass where attached to copper pipes. Clamps for other applications shall be of a type and Material that will minimize deterioration from galvanic action due to dissimilar metals.

### **E40.4 Installation - General**

E40.4.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, electrodes, conductors, connectors, accessories, as indicated, to conform to requirements of local authority having jurisdiction over installation.

E40.4.2 Install connectors in accordance with manufacturer's instructions.

E40.4.3 Protect exposed grounding conductors from mechanical injury.

E40.4.4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process or Burndy "HyGround" compression connectors.

E40.4.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

E40.4.6 Soldered joints not permitted.

E40.4.7 Install separate ground conductor to outdoor lighting standards.

E40.4.8 Ground secondary service pedestals.

- E40.4.9 All conduit runs containing feeders and branch circuits shall be complete with an insulated green ground wire bonded to all outlet boxes, junction boxes, pull boxes, equipment enclosures, etc. The conduit system shall be continuous but shall not be relied on to serve as the equipment grounding means. Ground conductors shall be sized according to the Canadian Electrical Code, but shall be minimum #12 AWG. All locknuts and couplings shall be securely tightened.
- E40.5 Electrodes
  - E40.5.1 Install electrodes and make grounding connections.
  - E40.5.2 Bond separate, multiple electrodes together.
  - E40.5.3 Use size 3/0 AWG copper conductors for connections to electrodes.
  - E40.5.4 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.
- E40.6 System and Circuit Grounding
  - E40.6.1 Install system and circuit grounding connections to neutral of 600 V and 208 V systems.
- E40.7 Equipment Grounding
  - E40.7.2 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, control panels, outdoor lighting.
- E40.8 Field Quality Control
  - E40.8.3 Perform tests in accordance with E32 - Common Work Results – For Electrical.
  - E40.8.4 Perform ground continuity and resistance tests using method appropriate to Site conditions and to approval of Contract Administrator and local authority having jurisdiction over installation. A report shall be submitted to the Contract Administrator from the testing agency.
  - E40.8.5 Perform tests before energizing electrical system.
  - E40.8.6 Disconnect ground fault indicator during tests.
- E41. CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS**
- E41.1 Related Sections
  - E41.1.1 Section E32 - Common Work Results - For Electrical.
- E41.2 References
  - E41.2.1 Canadian Standards Association (CSA)
    - .1 CSA C22.2 No. 83, Electrical Metallic Tubing.
    - .2 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.
    - .3 CAN/CSA C22.2 No. 227.3, Flexible Nonmetallic Tubing.
- E41.3 Conduits
  - E41.3.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.
  - E41.3.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

- E41.3.3 Rigid pvc conduit: to CSA C22.2 No. 211.2.
- E41.3.4 Flexible pvc conduit: to CAN/CSA C22.2 No. 227.3, Flexible Nonmetallic Tubing.
- E41.3.5 Minimum size of conduit shall be 19mm.
- E41.4 Conduit Fastenings
  - E41.4.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- E41.5 Conduit Fittings
  - E41.5.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
  - E41.5.2 Factory "ells" where 90° bends are required for 25 mm and larger conduits.
  - E41.5.3 Steel set screw connectors and couplings. Insulated throat liners on connectors.
  - E41.5.4 Raintight connectors and fittings c/w O-rings for use on weatherproof or sprinkleproof enclosures. Raintight couplings to be used for surface conduit installations exposed to moisture or sprinkler heads.
  - E41.5.5 Explosion proof in hazardous areas to meet requirements or authorities having jurisdiction.
- E41.6 Fish Cord
  - E41.6.1 Polypropylene with 3M spare length at each conduit end.
- E41.7 Installation
  - E41.7.1 Drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.
  - E41.7.2 Use rigid galvanized steel threaded conduit where specified.
  - E41.7.3 Use electrical metallic tubing (EMT) within building (Centennial Pool).
  - E41.7.4 Use rigid pvc conduit underground unless otherwise specified.
  - E41.7.5 Minimum conduit size for lighting and power circuits: 19 mm.
  - E41.7.6 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
  - E41.7.7 Mechanically bend steel conduit over 19 mm dia.
  - E41.7.8 Install fish cord in empty conduits.
  - E41.7.9 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
  - E41.7.10 Dry conduits out before installing wire.
  - E41.7.11 The conduit sizes as shown or indicated are the minimum acceptable and shall not be reduced without the approval of the Contract Administrator.
  - E41.7.12 Conduit to be sized as per Canadian Electrical Code or as shown on drawings and specifications. Note that the sizes of branch circuit conductors scheduled and/or specified on the drawings are minimum sizes and must be increased as required to suit length of run and voltage drop in accordance with Canadian Electrical Code. Where conductor sizes are increased to suit voltage drop requirements, increase the conduit size to suit.



## **E42. INSTALLATION OF CABLES IN TRENCHES AND IN DUCTS**

### **E42.1 Related Sections**

- E42.1.1 Section CW 2030 Excavation Bedding and Backfill.
- E42.1.2 Section E32 - Common Work Results - For Electrical.

### **E42.2 References**

- E42.2.1 Canadian Standards Association, (CSA International)
- E42.2.2 Insulated Cable Engineers Association, Inc. (ICEA)

### **E42.3 Cable Protection**

- E42.3.1 38 x 140 mm planks pressure treated with coloured, or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

### **E42.4 Markers**

- E42.4.1 Concrete type cable markers: 600 x 600 x 100 mm with words: cable, joint or conduit impressed in top surface, with arrows to indicate change in direction of cable or duct runs.

### **E42.5 Direct Burial of Cables**

- E42.5.1 After sand bed specified in CW 2030 Excavation Bedding and Backfill, is in place, lay cables maintaining 75 mm clearance from each side of trench to nearest cable. Do not pull cable into trench.
- E42.5.2 Provide offsets for thermal action and minor earth movements. Offset cables 150 mm for each 60 m run, maintaining minimum cable separation and bending radius requirements.
- E42.5.3 Underground cable splices not acceptable.
- E42.5.4 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.
- E42.5.5 Cable separation:
  - .1 Maintain 150 mm minimum separation between cables of different circuits.
  - .2 Maintain 300 mm horizontal separation between low and high voltage cables.
  - .3 When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position.
  - .4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables.
  - .5 Maintain 300 mm minimum lateral and vertical separation for fire alarm and control cables when crossing other cables, with fire alarm and control cables in upper position.
  - .6 Install treated planks on lower cables 0.6m in each direction at crossings.
- E42.5.6 After sand protective cover specified in in CW 2030 Excavation Bedding and Backfill, is in place, install continuous row of overlapping 38 x 140 mm pressure treated planks as indicated to cover length of run.

### **E42.6 Cable Installation in Ducts**

- E42.6.7 Install cables as indicated in ducts.
  - .1 Do not pull spliced cables inside ducts.

- E42.6.8 Install multiple cables in duct simultaneously.
- E42.6.9 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- E42.6.10 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- E42.6.11 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- E42.6.12 After installation of cables, seal duct ends with duct sealing compound.
- E42.7 Markers
  - E42.7.1 Mark cable every 150 m along runs and changes in direction.
  - E42.7.2 Where markers are removed to permit installation of additional cables, reinstall existing markers.
  - E42.7.3 Lay concrete markers flat and centred over cable with top flush with finish grade.
- E42.8 Field Quality Control
  - E42.8.1 Perform tests in accordance with Section E32 – Common Work Results – Electrical.
  - E42.8.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
  - E42.8.3 Check phase rotation and identify each phase conductor of each feeder.
  - E42.8.4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
  - E42.8.5 Provide Contract Administrator with list of test results showing location at which each test was made, circuit tested and result of each test. Include copies in Maintenance Manuals.
  - E42.8.6 Remove and replace entire length of cable if cable fails to meet any of test criteria.

### **E43. DIRECT BURIED UNDERGROUND CABLE DUCTS**

- E43.1 Related Sections
  - E43.1.1 Section E32 - Common Work Results - For Electrical.
  - E43.1.2 Section E33 – Wire and Box Connectors 0-1000 V
  - E43.1.3 Section E34 – Wires and Cables (0-1000 V)
  - E43.1.4 Section E37 – Installation of Cables In Trenches and In Ducts
- E43.2 PVC Ducts and Fittings
  - E43.2.1 Rigid PVC ducts for direct burial: with expanded flange ends, with minimum wall thickness at any point of 3.0 mm. Nominal length: 3 m plus or minus 12 mm.
  - E43.2.2 Rigid PVC couplings, reducers, bell end fittings, plugs, caps, adaptors as required to make complete installation.
  - E43.2.3 Rigid PVC 90 deg. and 45 deg. Bends as required.
  - E43.2.4 Rigid PVC 5 deg. angle couplings as required.

E43.2.5 Expansion joints every 100 m and as required.

E43.3 Solvent Weld Compound

E43.3.1 Solvent weld compound for PVC duct joints.

E43.4 Flexible Polyethylene Pipe

E43.4.1 References

.1 CAN/CSA-B137.4, Polyethylene Piping Systems for Gas Services.

E43.4.2 Construction

- .1 High density polyethylene pipe manufactured in accordance with CAN/CSA-B137.4. Manufactured with HDPE Type PE-3408 resin, having a minimum tensile strength of 23 MPa.
- .2 The pipe shall have a red colour additive.
- .3 A UV inhibitor shall be added to allow for three-year storage outdoors.
- .4 The pipe shall be manufactured with a .15% ± 0.15 by weight Erucamide Slip Additive. The additive shall be placed into the resin before the extrusion process.
- .5 The outside diameter and wall thickness shall be as shown in the table below:

SDR Pipe Data

SDR 17

Nominal Duct Size	Nominal OD	Nominal ID	Min Wall	Weight lbs/ft
¾"	1.050	0.906	0.062	0.092
1"	1.315	1.140	0.077	0.139
1 ¼"	1.660	1.445	0.098	0.218
1 ½"	1.900	1.656	0.112	0.282
2"	2.375	2.076	0.140	0.434
2 ½"	2.875	2.516	0.169	0.629
3"	3.500	3.064	0.206	0.932
4"	4.500	3.939	0.265	1.540
5"	5.562	4.868	0.327	2.352
6"	6.625	5.799	0.390	3.337

E43.4.3 Marking

- .1 The pipe shall be marked with the following information:
  1. manufacturer's name,
  - .2 polyethylene grade,
  - .3 manufacturing date.

E43.4.4 Packaging

- .1 The pipe shall be supplied on disposable wooden reels strong enough to withstand transportation, loading, unloading and pipe removal during installation. The maximum width and height of the reels shall be 1.17m and 2.8m respectively.
- .2 The pipe shall be supported with strapping which allows for no more than one layer of pipe to be released from the reels after cutting a strap.

E43.5 Cable Pulling Equipment

E43.5.1 6 mm stranded nylon pull top tensile strength 5 kN.

#### E43.6 Markers

- E43.6.1 Concrete type cable markers: as indicated, with words: "cable", "joint" or "conduit" and name of electrical system impressed in top surface, with arrows to indicate change in direction of duct runs.

#### E43.7 Installation

- E43.7.1 Install duct in accordance with manufacturer's instructions.
- E43.7.2 Clean inside of ducts before laying.
- E43.7.3 Ensure full, even support every 1.5m throughout duct length.
- E43.7.4 Slope ducts with 1 to 400 minimum slope.
- E43.7.5 During construction, cap ends of ducts to prevent entrance of foreign materials.
- E43.7.6 Pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- E43.7.7 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.
- E43.7.8 Install markers as required.
- E43.7.9 Clearly show locations on Record Drawings c/w dimensions from building, curbs, property lines, etc.

### **E44. METERING AND SWITCHBOARD INSTRUMENTS**

#### E44.1 Summary

- E44.1.1 Section Includes: Materials, components, cabinets, instruments, and installation for metering and switchboard Instruments.

#### E44.2 Related Sections

- E44.2.2 Section E32 – Common Work Results - Electrical

#### E44.3 References

- E44.3.3 American National Standards Institute (ANSI)
  - .1 ANSI C39.1, Requirements, Electrical Analog Indicating Instruments.
- E44.3.4 Canadian Standards Association, (CSA International)
  - .1 CAN3-C17, Alternating – Current Electricity Metering.

#### E44.4 Product Data

- E44.4.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
- E44.4.2 Indicate meter, instrument, outline dimensions, panel drilling dimensions and include cutout template.

#### E44.5 Meter

- E44.5.1 Single-phase or Polyphase, kilowatt-hour energy meter: to CAN3-C17.
- E44.5.2 To be provided by Manitoba Hydro.

#### E44.6 Meter Socket

- E44.6.1 Weatherproof meter sockets to Manitoba Hydro Standards.
- E44.7 Meter Cabinet
  - E44.7.1 Sheet steel CSA enclosure with meter backplate, to accommodate meters and associated equipment, factory installed and wired.
- E44.8 Metering Installation
  - E44.8.1 Install meters in location free from vibration and shock.
  - E44.8.2 Make connections in accordance with diagrams.
- E44.9 Field Quality Control
  - E44.9.1 Conduct tests in accordance with Section E32 – Common Work Results – For Electrical and in accordance with manufacturer’s recommendations.

**E45. LIGHTING CONTROL DEVICES – PHOTOELECTRIC**

- E45.1 Related Sections
  - E45.1.1 Section E32 - Common Work Results - For Electrical.
- E45.2 Product Data
  - E45.2.1 Submit product data in accordance with this contract.
- E45.3 Photoelectric Lighting Control
  - E45.3.1 Luminaire mounting.
  - E45.3.2 Capable of switching 1800 W of lighting at 120 V.
  - E45.3.3 Voltage variation: plus or minus 10%.
  - E45.3.4 Temperature range: minus 40 EC to plus 40 EC.
  - E45.3.5 Switching on lights at 20 lx.
  - E45.3.6 Switching off lights at 400 lx.
  - E45.3.7 Rated for 5000 operations.
  - E45.3.8 Options:
    - .1 Fail-safe circuit completed when relay de-energized.
    - .2 Terminal strip.
    - .3 Sensitivity adjustment.
  - E45.3.9 Switching time delay of 30 s.
  - E45.3.10 Colour coded leads: size 10 AWG, 460 mm long.
- E45.4 Installation
  - E45.4.1 Install photoelectric controls in accordance with manufacturer’s instructions.

**E46. SERVICE EQUIPMENT**

- E46.1 Summary
  - E46.1.1 Section Includes: Service equipment and installation.
- E46.2 Related Sections

- E46.2.1 Section E35 – Grounding – Secondary.
- E46.2.2 Section E47 – Moulded Case Circuit Breakers.
- E46.2.3 Section E48 – Disconnect Switches – Fused and Non-Fused.
- E46.2.4 Section E46 – Ground Fault Circuit Interrupters – Class ‘A’.
- E46.3 Waste Management and Disposal
  - E46.3.1 Remove from Site and dispose of all packaging Materials at appropriate recycling facilities.
- E46.4 Equipment
  - E46.4.1 Fused disconnect switch: in accordance with Section E48 – Disconnect Switches – Fused and Non-Fused, rating as indicated. Service entrance rated.
  - E46.4.2 Enclosed circuit breaker: in accordance with Section E47 – Moulded Case Circuit Breakers, rating as indicated. Service entrance rated.
  - E46.4.3 Panelboard breaker type: in accordance with Section E42 – Panelboards Breaker Type.
  - E46.4.4 Cabinet type ‘A’ for utility revenue metering.
  - E46.4.5 Ground fault equipment: in accordance with Section E46 – Ground Fault Circuit Interrupters – Class ‘A’.
- E46.5 Installation
  - E46.5.6 Install service equipment.
  - E46.5.7 Connect to incoming service.
  - E46.5.8 Connect to outgoing load circuits.
  - E46.5.9 Install ground fault equipment.
  - E46.5.10 Make grounding connections in accordance with Section E35 – Grounding – Secondary.
  - E46.5.11 Make provision for power supply authority’s metering.
- E47. PANELBOARDS BREAKER TYPE**
- E47.1 Summary
  - E47.1.1 Section Includes: Materials and installation for standard and custom breaker type panelboards.
- E47.2 Related Sections
  - E47.2.1 Section E32 – Common Work Results – Electrical.
  - E47.2.2 Section E47 – Moulded Case Circuit Breakers.
- E47.3 References
  - E47.3.1 Canadian Standards Association (CSA International)
    - .1 CSA C22.2No.29, Panelboards and enclosed Panelboards.
- E47.4 Shop Drawings
  - E47.4.1 Submit Shop Drawings in accordance with this contract.

E47.4.2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity, and enclosure dimension.

E47.5 Panelboards

E47.5.3 Panelboards: to CSA C22.2No.29 and product of one manufacturer.

- .1 Install circuit breakers in panelboards before shipment.
- .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

E47.6 Breakers

E47.6.1 Breakers: to Section E47 – Moulded Case Circuit Breakers.

E47.6.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

E47.6.3 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

E47.6.4 Lock-on devices for breakers feeding lighting circuits. Turn over unused lock-on devices to The City.

E47.7 Equipment Identification

E47.7.1 Provide equipment identification in accordance with Section E32 – Common Work Results – Electrical.

E47.7.2 Nameplate for each panelboard size 4 engraved as indicated. Nameplate to include contact information of persons/parties with access to panel. (Final information to be determined.)

E47.7.3 Complete circuit directory with typewritten legend showing location and load of each circuit.

E47.8 Installation

E47.8.4 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

E47.8.5 Mount panelboards to concrete base with anchor bolts as required (per manufacturer's installation recommendations.)

E47.8.6 Connect load to circuits.

E47.8.7 Connect branch circuit neutral conductors to common neutral bus. Common neutrals shall be shared by vertically adjacent breakers except for GFI protected branch circuits which shall not share neutrals with other circuits. Neutral conductors shall be identified with mylar/cloth wire markers showing the circuit numbers of the circuits sharing the neutral.

E47.8.8 Wiring in panelboards shall be neat and set in as if laced. All neutral conductors shall be identified in the panel with their associated circuit numbers by means of Brady Markers.

**E48. ELECTRICAL CABINETS AND ENCLOSURES**

E48.1 Related Sections

E48.2 Section E32 – Common Work Results – Electrical.

E48.3 References

E48.3.1 The Munsell System of Colour Notation.

**E48.4 Shop Drawings and Product Data**

E48.4.1 Submit Shop Drawings and product data in accordance with this contract.

**E48.5 Materials**

E48.5.1 Enclosure constructed with 2.7 mm thick minimum steel, with weather and corrosion resistant finish, Munsell Notation 7.5GY3.5/1.5, size as indicated.

E48.5.2 Entire enclosure capable of withstanding maximum impact force of 86 MN/m<sup>2</sup> area without rupture of material.

E48.5.3 Removable enclosure panels with formed edges, galvanized steel external fasteners removable only from inside enclosure.

E48.5.4 Cover: tamperproof, bolt-on, domed to shed water.

E48.5.5 Door: minimum 4500 mm wide, hinged, 3 point latching, with padlocking means.

E48.5.6 Ventilation panel constructed to allow air circulation yet preventing entry of foreign objects, wild life, vermin.

**E48.6 Installation**

E48.6.1 Assemble enclosure in accordance with manufacturer's instructions and mount on concrete pad.

E48.6.2 Mount equipment in enclosure.

**E49. WIRING DEVICES**

**E49.1 Related Work Specified Elsewhere**

E49.1.1 Section E32 – Common Work Results – Electrical.

E49.1.2 Section E36 - Conduits, Conduit Fastenings and Conduit Fittings.

**E49.2 Submittals**

E49.2.1 Submit Shop Drawings and product data in accordance with this contract.

**E49.3 References**

E49.3.1 Canadian Standards Association (CSA International)

.1 CSA-C22.2 No.42-99(R2002), General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CSA-C22.2 No.42.1-00, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standards, with UL 514D).

**E49.4 Shop Drawings and Product Data**

E49.4.1 Submit Shop Drawings and product data in accordance with Section E32 – Common Work Results – Electrical.

**E49.5 Waste Management and Disposal**

E49.5.1 Remove from Site and dispose of all packaging Materials at appropriate recycling facilities.

**E49.6 Receptacles**

E49.6.1 Duplex receptacles, CSA type 5-15 R, 125 Vac, 15 A, U ground, with following features:

.1 Nylon face, brown or ivory for normal power.



- .2 Suitable for No. 10 AWG for back and side wiring.
- .3 Double wipe contacts and riveted grounding contacts.
- E49.6.2 Receptacles of one manufacturer throughout the project.
- E49.6.3 Acceptable manufacturers: Hubbell, Arrow Hart, Bryant, Pass & Seymour, Slater. Catalogue No. 5262 for all manufacturers.
- E49.6.4 Acceptable manufacturers for ground fault receptacles shall be:
  - .1 Arrow Hart – GF 5242
  - .2 Bryant – GFR 52FT
  - .3 Hubbell – GF 5252
  - .4 Pass & Seymour – 1591-R
- E49.7 Special Wiring Devices
  - E49.7.1 Special wiring devices: as indicated on Drawings.
- E49.8 Cover Plates
  - E49.8.1 Cover plates from one manufacturer throughout project.
  - E49.8.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
  - E49.8.3 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.
- E49.9 Installation
  - E49.9.1 Receptacles:
    - .1 Mount receptacles horizontally at height specified in Section E32 or as indicated.
    - .2 Horizontally mounted receptacles shall have the hot line terminal on the bottom.
    - .3 Suitably ground all receptacles with #12 green insulated wire to outlet box.
  - E49.9.2 Coverplates:
    - .1 Install suitable common coverplates where wiring devices are ganged.
    - .2 Provide a coverplate on each outlet.
- E49.10 Identification
  - E49.10.1 Identify receptacles with size 1 nameplate indicating circuit number. Nameplates to be mechanically fastened. Refer to Section E32.
- E50. FUSES – LOW VOLTAGE**
- E50.1 Related Sections
  - E50.1.1 Section E32 – Common Work Results – Electrical.
- E50.2 Submittals
  - E50.2.1 Submit Shop Drawings and product data in accordance with Section E32 – Common Work Results – For Electrical.
- E50.3 Delivery and Storage
  - E50.3.1 Ship fuses in original containers.

#### E50.4 Fuses - General

- E50.4.1 Plug & cartridge fuses: To CSA 622.2 No.59.
- E50.4.2 Fuse type references L1, L2, J1, R1, etc. have been adopted for use in this specification.
- E50.4.3 Fuses: product of one manufacturer.

#### E50.5 Fuse Types

- E50.5.1 Class J fuses.
  - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

#### E50.6 Installation

- E50.6.1 Install fuses in mounting devices immediately before energizing circuit.
- E50.6.2 Ensure correct fuses fitted to physically matched mounting devices.
- E50.6.3 Ensure correct fuses fitted to assigned electrical circuit.

### **E51. GROUND FAULT CIRCUIT INTERRUPTERS – CLASS “A”**

#### E51.1 Related Sections

- E51.1.1 Section E32 – Common Work Results – Electrical.
- E51.1.2 Section E42 – Panelboards Breaker Type

#### E51.2 References

- E51.2.1 Canadian Standards Association (CSA International)
  - .1 CSA-C22.2 No.144, Ground Fault Circuit Interrupters.
- E51.2.2 National Electrical Manufacturers Association (NEMA)
  - .1 NEMA PG 2.2, Application Guide for Ground Fault Protection Devices for Equipment.

#### E51.3 Submittals

- E51.3.1 Submit product data and shop drawings in accordance with Section E32 – Common Work Results – For Electrical.
- E51.3.2 Submit test report for field testing of ground fault equipment to Consultant and a certificate that system as installed meets criteria specified herein.

#### E51.4 Materials

- E51.4.1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No. 144 NEMA PG 2.2.
- E51.4.2 Components comprising ground fault protective system to be of same manufacturer.

#### E51.5 Breaker Type Ground Fault Interrupter

- E51.5.1 Single pole ground fault circuit interrupter for 20 A, 120 V, 1 phase circuit c/w test and reset facilities.

#### E51.6 Ground Fault Protector Unit

- E51.6.1 Self-contained with 20 A, 120 V circuit interrupter and duplex single receptacle complete with:
  - .1 Solid state ground sensing device.

- .2 Facility for testing and reset.
- .3 CSA Enclosure 1, surface flush mounted with stainless steel painted face plate.

#### E51.7 Installation

- E51.7.2 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

#### E51.8 Field Quality Control

- E51.8.3 Perform tests in accordance with Section E32 – Common Work Results – For Electrical and co-ordinate with the Contract Administrator where required.
- E51.8.4 Arrange for field testing of ground fault equipment by Contractor before commissioning service.
- E51.8.5 Demonstrate simulated ground fault tests.
- E51.8.6 Submit report of tests to Consultant and a certificate that system as installed meets criteria specified herein. Include copies of report in maintenance manuals.

### **E52. MOULDED CASE CIRCUIT BREAKERS**

#### E52.1 Related Sections

- E52.1.1 Section E41 – Service Equipment.
- E52.1.2 Section E42 – Panelboards Breaker Type.
- E52.1.3 Section E46 – Ground Fault Circuit Interruptors – Class ``A``.

#### E52.2 References

- E52.2.1 Canadian Standards Association (CSA)
  - .1 CSA-C22.2 No. 5-02, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

#### E52.3 Submittals

- E52.3.1 Submit product data & Shop Drawings in accordance with Section E32 - Common Work Results - For Electrical.
- E52.3.2 Include time-current characteristic curves for breakers with ampacity of 100 A and over.

#### E52.4 Breakers General

- E52.4.1 Moulded-case circuit breakers, Circuit breakers, and Ground-fault circuit-interrupters: to CSA C22.2 No. 5.
- E52.4.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.
- E52.4.3 Common-trip breakers: with single handle for multi-pole applications.
- E52.4.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
- E52.4.5 Circuit breakers with interchangeable trips as indicated.
- E52.4.6 Minimum Interrupting Ratings (RMS Symmetrical) unless otherwise indicated:
  - .1 120/208 Volts – 10,000 Amps

.2 347/600 Volts – 14,000 Amps

E52.5 Thermal Magnetic Breakers Design

E52.5.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

E52.6 Installation

E52.6.1 Install circuit breakers as indicated.

**E53. DISCONNECT SWITCHES – FUSED AND NON-FUSED**

E53.1 Product Data

E53.1.1 Submit product data in accordance with this contract.

E53.2 References

E53.2.1 Canadian Standards Association (CSA International)

.1 CAN/CSA C22.2 No.4-M89 (R2000), Enclosed Switches.

.2 CSA C22.2 No. 39-M89 (R2003), Fuseholder Assemblies.

E53.3 Waste Management and Disposal

E53.3.1 Remove from Site and dispose of packaging Materials at appropriate recycling facilities.

E53.4 Disconnect Switches

E53.4.1 Fusible and non-fusible disconnect switch in CSA Enclosure and size as indicated. To suit the environment (i.e. weatherproof, watertight, dust-tight, general purpose, etc.).

E53.4.2 Provision for padlocking in on-off switch position by three locks.

E53.4.3 Mechanically interlocked door to prevent opening when handle in ON position.

E53.4.4 Fuses: size as indicated, to Section E45 – Fuses – Low Voltage.

E53.4.5 Fuseholders: suitable without adaptors, for type and size of fuse indicated.

E53.4.6 Quick-make, quick-break action, heavy duty industrial grade.

E53.4.7 ON-OFF switch position indication on switch enclosure cover.

E53.4.8 Disconnects used for service entrances shall be approved service entrance switches.

E53.5 Equipment Identification

E53.5.1 Provide equipment identification in accordance with Section E32 – Common Work Results – For Electrical.

E53.5.2 Indicate name of load controlled and voltage on size 6 nameplate.

E53.6 Installation

E53.6.1 Install disconnect switches complete with fuses as indicated.

E53.6.2 Install additional brackets, supports, etc. required for mounting the disconnect switches.

## **E54. LIGHT POLES AND FIXTURES**

### **E54.1 Summary**

E54.1.1 Section Includes: Materials and installation for aluminum lighting poles.

### **E54.2 Related Sections**

E54.2.1 Section E32 – Common Work Results – Electrical.

### **E54.3 References**

E54.3.1 Canadian Standards Association (CSA International)

- .1 CSA A14-00, Concrete Poles.
- .2 CSA C22.2No.206-M1987(R1999), Lighting Poles.

### **E54.4 Submittals**

E54.4.1 Submit product data in accordance with this contract.

### **E54.5 Waste Management and Disposal**

E54.5.2 Remove from Site and dispose of packaging Materials at appropriate recycling facilities.

### **E54.6 Aluminum Poles**

E54.6.1 Designed for underground wiring and:

- .1 Mounting on concrete anchor base.
- .2 Style: round.
- .3 Straight for one luminaire mounting brackets.
- .4 Access handhole 400 mm above pole base for wiring connections, with welded-on reinforcing frame and bolted-on cover.
- .5 Finish: to match light fixtures.
- .6 Grounding lug.

### **E54.7 Luminaires**

E54.7.1 Luminaire with cast aluminum weatherproof housing and:

- .1 Lamp type and wattage: as per drawings.
- .2 Optical Assembly:
  - .1 For metal halide or high pressure sodium lamps:
    - .1 Reflector: sheet aluminum with Alzak finish.
    - .2 Refractor: one piece prismatic glass prismatic virgin acrylic.
    - .3 Gasket: neoprene seal between refractor and housing.
  - .3 Light Distribution
    - .1 Refer to Drawings.
  - .4 Self-locking latches of stainless steel and aluminum.

### **E54.8 Installation**

E54.8.1 Install poles true and plumb, complete with brackets in accordance with manufacturer's instructions.

- E54.8.2 Install luminaires on poles and install lamps.
- E54.8.3 Check luminaire orientation, level and tilt.
- E54.8.4 Connect luminaire to lighting circuit.
- E54.8.5 Perform tests in accordance with Section E32 – Common Work Results for Electrical.

**E55. SITE CLEANUP**

- E55.1 All pathways, streets, laneways and properties near the Work Site shall be kept clean at all times by the Contractor.
- E55.2 Upon completion the Contractor shall immediately remove all excess materials and debris from the Work Site.

**E56. SITE SAFETY PROCEDURES**

- E56.1 The Contractor shall be solely responsible for construction and public safety at the Site and for securing the Site at all times to prevent public access.
- E56.2 The Contractor shall, at his own expense, do whatever is necessary to ensure that when Work is stopped and the Contractor leaves the Site for whatever reason, the Site and Work is made safe, including but not limited to:
  - (a) The removal and/or safe storage of all construction equipment and materials;
  - (b) The equipment installed and/or in the process of installation be completed or secured to ensure that no public hazards exist.
  - (c) That all open excavations be filled; and that all construction debris and surplus excavation materials be removed from Site.