



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 240-2012

SUPPLY AND DELIVERY OF TRAFFIC SIGNAL POLES AND ARMS

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 SUPPLY AND DELIVERY OF TRAFFIC SIGNAL POLES AND ARMS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, April 13, 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. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.

B3.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B3.5 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B3.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. ADDENDA

B4.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

B4.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B4.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>

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

B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B5. SUBSTITUTES

- B5.1 The Work is based on the materials, equipment, methods and products specified in the Bid Opportunity.
- B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B5.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least seven (7) Business Days prior to the Submission Deadline.
- B5.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the material, equipment, method or product as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract.
- B5.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B5.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B5.6.1 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.
- B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B13.
- B5.9 No later claim by the Contractor for an addition to the price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B5.10 Notwithstanding B5.2 to B5.9, and in accordance with B6.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B13.1(a).

B6. BID SUBMISSION

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

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

- B6.2 Further to B6.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B5.
- B6.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B6.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B6.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1
- B6.5.1 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.
- B6.6 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.
- B6.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B13.1(a).
- B6.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.
- B6.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B6.9 Bids submitted by internet electronic mail (e-mail) will not be accepted.

B7. BID

- B7.1 The Bidder shall complete Form A: Bid, making all required entries.
- B7.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B7.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B7.2.
- B7.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B7.4 Paragraph 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 and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B7.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B7.5 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.

B8. PRICES

B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B8.1.1 Prices on Form B: Prices shall include:

- (a) duty;
- (b) freight and cartage;
- (c) Provincial and Federal taxes [except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable] and all charges governmental or otherwise paid;
- (d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.

B8.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B8.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9. QUALIFICATION

B9.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B9.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information

Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>

- B9.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) have successfully carried out work similar in nature, scope and value to the Work;
 - (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract;
 - (c) be fully approved by the Canadian Welding Bureau (CWB) as per CSA W47.1-03 Certification of Companies for Fusion Welding of Steel;
 - (d) have demonstrated the ability to supply and deliver work(s) with Quality Control and Assurance Standards according to past contracted delivery requirements and timelines; and
 - (e) have demonstrated the resources, facilities, and capabilities to quickly and efficiently effect repairs or remediation to the satisfaction of contract administrators, or other customers, on issues with Work(s) on previous contract(s) to meet the specifications and requirements of the supplied Work, regardless of time of year, or environmental conditions.
- B9.4 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B9.5 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B10. OPENING OF BIDS AND RELEASE OF INFORMATION

- B10.1 Bids will not be opened publicly.
- B10.2 Following the Submission Deadline, the names of the Bidders and their bid prices (unevaluated, and pending review and verification of conformance with requirements or evaluated prices) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B10.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B10.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B11. IRREVOCABLE BID

- B11.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 of Form A: Bid.
- B11.2 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.

B12. WITHDRAWAL OF BIDS

- B12.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B12.1.1 Notwithstanding C21, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B12.1.2 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.
- B12.1.3 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 B12.1.3(b), declare the Bid withdrawn.
- B12.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B11.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law.

B13. EVALUATION OF BIDS

- B13.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B9 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B5.
- B13.2 Further to B13.1(a), the Award Authority may reject a Bid as being non responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities if the interests of the City so require.
- B13.3 Further to B13.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B13.4 Further to B13.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B13.5 This Contract will be awarded as a whole.

B14. AWARD OF CONTRACT

- B14.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B14.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

- B14.2.1 Without limiting the generality of B14.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B14.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B13.
- B14.3.1 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.
- B14.4 Notwithstanding C4 and Paragraph 6 of Form A:Bid, the City will issue a purchase order to the successful Bidder in lieu of the execution of a Contract.
- B14.5 The Contract Documents, as defined in C1.1(n)(ii), in their entirety shall be deemed to be incorporated in and to form a part of the purchase order notwithstanding that they are not necessarily attached to or accompany said purchase order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for the Supply of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for the Supply of Goods* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Supply of Goods*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the supply and delivery of traffic signal poles and arms for the period from the date of award until June 1, 2013, with the option of three (3) mutually agreed upon one (1) year extensions.

D2.1.1 The City may negotiate the extension option with the Contractor within sixty (60) Calendar Days prior to the expiry date of the Contract. The City shall incur no liability to the Contractor as a result of such negotiations.

D2.1.2 Changes resulting from such negotiations shall become effective on June 1st of the respective year. Changes to the Contract shall not be implemented by the Contractor without written approval by the Contract Administrator.

D2.2 The Work shall be done on an "as required" basis during the term of the Contract.

D2.2.1 The type and quantity of Work to be performed under this Contract shall be as authorized from time to time by the Contract Administrator and/or Users.

D2.2.2 Notwithstanding C7, the City shall have no obligation under the Contract to purchase any quantity of any item in excess of its actual operational requirements.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Jonathan Foord, EIT
Traffic Signals Asset Engineer
821 Elgin Avenue, Winnipeg, MB R3E 3R1
Telephone No.: (204) 986-6619
Facsimile No.: (204) 772-6306

D4. NOTICES

D4.1 Notwithstanding C21.3, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:

The City of Winnipeg
Chief Financial Officer
Facsimile No.: (204) 949-1174

SUBMISSIONS

D5. AUTHORITY TO CARRY ON BUSINESS

D5.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on

business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

SCHEDULE OF WORK

D6. COMMENCEMENT

- D6.1 The Contractor shall not commence any Work until he is in receipt of a notice of award from the City authorizing the commencement of the Work.
- D6.2 The Contractor shall not commence any Work until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D5;
 - (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.
 - (c) All samples and documentation as described in E3 have been received and approved by the Contract Administrator.

D7. DELIVERY

- D7.1 Goods shall be delivered within sixty(60) Calendar Day(s) of the placing of an order, unless otherwise allowed by the User at the time of ordering, f.o.b. destination, freight prepaid, to:
- Public Works Stores
1277 Pacific Avenue
Winnipeg, MB
- D7.2 The Contractor shall confirm each delivery with the Contract Administrator or his/her designate, at least two (2) Business Days before delivery.
- D7.3 Goods shall be delivered between 8:30 a.m. and 2:30 p.m. on Business Days.
- D7.4 The Contractor shall off-load goods as directed at the delivery location.

D8. ORDERS

- D8.1 The Contractor shall provide a local Winnipeg telephone number or a toll-free telephone number at which orders for delivery may be placed.
- D8.2 A minimum order will consist of at least twenty (20) poles or davit arms of a given item, for the following items:
- (a) 13 Foot Light Duty Davit Shaft Poles;
 - (b) 8 Foot Single Davit Arms;
 - (c) 12 Foot Single Davit Arms;
 - (d) 18 Foot Straight Shaft Poles;
- D8.3 A minimum order will consist of at least five (5) poles or davit arms of a given item, for the following items:
- (a) 8 Foot Double Davit Arms
 - (b) 12 Foot Double Davit Arms
 - (c) 16 Single Davit Arms
 - (d) 35 Foot Streetlighting Joint Use Poles

D9. RECORDS

- D9.1 The Contractor shall keep detailed records of the goods supplied under the Contract.
- D9.2 The Contractor shall record, as a minimum, for each item listed on Form B: Prices:
- (a) user name(s) and addresses;
 - (b) order date(s);
 - (c) delivery date(s); and
 - (d) description and quantity of goods supplied.
- D9.3 The Contractor shall provide the Contract Administrator with a copy of the records for each quarter year within fifteen (15) Calendar Days of the end of that quarter.

MEASUREMENT AND PAYMENT

D10. INVOICES

- D10.1 Further to C10, the Contractor shall submit an invoice for each order delivered to:
- The City of Winnipeg
Corporate Finance - Accounts Payable
4th Floor, Administration Building, 510 Main Street
Winnipeg MB R3B 1B9
- Facsimile No.: (204) 949-0864
Email: CityWpgAP@winnipeg.ca
- D10.2 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.
- D10.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.
- D10.4 Bids Submissions must be submitted to the address in B6.5

D11. PAYMENT

- D11.1 Further to C10, payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Contractor's invoice.
- D11.2 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D12. WARRANTY

- D12.1 Warranty is as stated in C11.

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 Drawings and documents listed in Table E1.2 are applicable to the Work:

Table E1.2– Table of External Documents

Drawing Number Revision / Document	Item 1 13 Foot Davit Shaft E4	Items 2, 3, 4, 5, 6 8 Foot (sgl & dbl), 12 Foot (snl & dbl) & 16 Foot Davit Arms E14	Item 7 35 Foot Joint Use Pole E24	Item 8 18 Foot Pole E34	Comments
ST-111 R2	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ST-136 R1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
ST-158 R1			<input checked="" type="checkbox"/>		(3 sheets)
ST-161 R3	<input checked="" type="checkbox"/>				(2 sheets)
ST-163 R1			<input checked="" type="checkbox"/>		
ST-164 R1	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	For reference
ST-166 R2				<input checked="" type="checkbox"/>	(2 sheets)
ST-169 R0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
TS-IMP1 R0	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
TS-RPD1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Copy as required

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B5.

E1.4 Contractors have the responsibility to ensure quality of final work. Any discrepancies or inconsistencies discovered in specification review shall be brought to the attention of the Contract Administrator prior to starting the Work.

E2. GOODS

E2.1 The Contractor shall supply Traffic Signal Poles and Arms in accordance with the requirements hereinafter specified.

E2.2 The materials used as specified for fabrication shall be new and not previously used.

E2.3 **Item No. 1 – 13' Light Duty Davit Shaft Pole** shall be as per Work Item Specification Details contained in E4 to E13.

E2.4 **Item No. 2 – 8' Single Davit Arm, Item No. 3 – 12' Single Davit Arm, Item No. 4 – 16' Single Davit Arm, Item No. 5 – 8' Double Davit Arm, and Item No. 6 – 12' Double Davit Arm** shall be as per Work Item Specification Details contained in E14 to E23.

E2.5 **Item No. 7 – 35' Streetlighting Joint Use Pole** shall be as per Work Item Specification Details contained in E24 to E32.9

E2.6 **Item No. 8 – 18' Straight Shaft Pole** shall be as per Work Item Specification Details contained in E34 to E43

E3. SAMPLES AND DOCUMENTATION

- E3.1 Prior to the Contract Administrator authorizing any works to proceed, the following must be provided to the Contract Administrator for review and approval:
- (a) Mill Specification documents stating gauge of steel being used in each component of the final assembly, which must include statement of minimum Ksi yield detail and statement of silicon content of steel of less than 0.06 percent;
 - (b) Document containing photocopies of CWB of CSA 47.1-03 certifications of fabricators that will be responsible for manufacturing the steel poles;
 - (c) Sample of Aluminum tamper-proof cup washer used to secure non-metal access panel cover;
 - (d) Sample of mounting bracket with Auveco Part Number 10054 (or equal) attached;
 - (e) Sample of Type 316 3/8" x 2 1/2" Stainless Steel bolt with 9/16" hex head;
 - (f) Sample of handhole cover (if not on the pre-approved list); and
 - (g) Other samples and documents as noted.
- E3.2 Prior to shipping, all required documentation must have been received and approved by the Contract Administrator, including (as required) the TS-RPD1 forms, which records a random sampling of across flat measurements of davit shafts and arms intermating points.

E4. 13 FOOT LIGHT DUTY DAVIT SHAFT POLES

E5. MATERIALS

- E5.1 The Contractor shall supply and deliver thirteen (13) foot traffic signal light duty davit shaft poles that are suitable for use with current and future inventory of davit arms of 8 foot, 12 foot and 16 foot reach and double davit arms of 8 foot and 12 foot reach.
- E5.2 The octagonal pole shaft walls of the traffic signal light duty pole shaft shall be fabricated from 7 gauge structural steel meeting as a minimum the requirements of the ASTM A570 Grade 50 (50 ksi Design Yield Strength).
- NOTE:** Steel shall not be acceptable unless the mill test certificate states the grade to be 50 ksi minimum yields. Lower grade steel shall not be acceptable (despite favourable published mill test yield results) and pole shafts fabricated without steel certification shall be rejected.
- E5.3 The 7 gauge structural steel used in the pole shaft shall have silicon content less than or equal to 0.06 percent. Other steel components shall have silicon content controlled as required to prevent detrimental galvanizing effects.
- E5.4 The base plate material shall be steel meeting the requirements of CSA G40.21 44W.
- E5.5 The access panel cover shall be **non-metal**.
- E5.6 Type 316 stainless steel (non-magnetic) hardware shall be used for:
- (a) The 1/4 inch x 1 1/2 inches long grounding bolt and the two grounding bolt nuts inside the access panel;
 - (b) The two 3/8 inch x 2 1/2 inches long hex head bolts which fasten the access panel cover to the wiring access panel; and
 - (c) The 3/8 inch x 1 1/2 inches long hex head bolt which secures the removable terminal strip bracket to the upper mounting bracket within the wiring access panel.
- E5.7 Aluminum shall be used for the tamper-proof cup washers (Drawing No. ST-164 R1), associated with the wiring access panel.

E6. CERTIFIED DETAILED DRAWINGS

- E6.1 The engineer certified detailed drawings include a material list and all dimensions and tolerances applicable to all critical dimensions. On the drawings, details are included for every element of the traffic signal light duty davit pole shaft (for use with davit arms of 8 feet, 12 feet and 16 feet horizontal reach), including:
- (a) Base plate;
 - (b) 4 3/4 inch x 24 inch (38 circuit) access panel detail;
 - (c) Removable terminal strip bracket/mounting bracket assemblies;
 - (d) 4 3/4 inch x 24 inch access panel cover; and
 - (e) Tamper proof cup washer.

E7. CERTIFIED STRUCTURAL STRESS ANALYSIS

- E7.1 The engineer certified structural stress analysis of the traffic signal light duty davit pole shaft includes calculations of stresses at the base of the pole and at the access panel. Placement of all attachments to the pole are as described in detail in E8.3 "Pole Attachment Configurations". Loading is prescribed in E8.1 "AASHTO Standards" and E8.2 "Wind Loading".
- E7.2 For the purposes of the stress analysis, the nominal spread of compatible davit arms as shown on Drawing No. ST-169 R0 and Drawing No. ST-136 R1 as measured to the end of the octagonal section of the arm are: eight feet, zero inches (8' 0"); twelve feet, zero inches (12' 0"); and sixteen feet, zero inches (16' 0").
- E7.3 The davit arms as shown in Drawing No. ST-169 R0 are to have an eighteen (18) degree rise section with a one (1) foot (nominal) straight level section at the end of the davit arm to provide for a tenon height of nineteen feet, three inches (19' 3"; +3", -0") above the base of the pole for both the 8 foot and 12 foot davit arms and twenty feet six inches (20' 6"; +3", -0") above the base of the pole for the 16 foot davit arms.
- E7.4 Drawing No. ST-136 R1 is the double davit arm described in E8.3(f) **Configuration 6** and in E8.3(g) **Configuration 7** of "Pole Attachment Configurations".

E8. DESIGN STANDARDS

- E8.1 **AASHTO Standards:** The traffic signal light duty davit pole shaft for use with designated davit arms is designed in accordance with the 2001 4th edition and latest revisions of The American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals.
- E8.2 **Wind Loading:** The traffic signal light duty davit pole shaft is designed to withstand design wind pressure $P_z = 0.00256 K_z G V_2 I_r C_d$ pounds per square foot, where $(0.00256 G V_2) = 25.6$ psf, K_z s per AASHTO table 3-5 except not less than 1.0, $I_r = 1.0$ for 50 year design life and C_d as per ASHTO table 3-6. This pressure is applied to the pole including davit arms, with specific signal head and sign attachments as herein described in E8.3 "Pole Attachment Configurations".
- E8.3 **Pole Attachment Configurations:** The light duty davit pole shaft is designed to support traffic signal heads, pedestrian corridor units and traffic signs when loaded as specified without distress. The structural design calculations and stress analysis takes into account the following configurations of attachments to the light duty davit pole shaft and arms (Drawing No. ST-161 R3 Sheet 2):
- (a) **Configuration 1:** For single davit arms of 12 feet and 16 feet reach only, Signal Head Mounting Style – Hanger;
 - (i) Attachment on the 12 and 16 foot davit arm and hanger: One (3 section x 12 inch) signal head: dimensioned 14 inches wide x 42 inches high - weight fifty (50) lbs. (top of signal head mounted 8 inches below centerline of davit arm tenon) and

- (ii) Attachment on the davit pole shaft: Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (iii) Attachment on the davit pole shaft: One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft: One traffic sign: dimensioned 36 inches wide x 12 inches high - weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
 - (v) Attachment on the davit pole shaft: One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign).
- (b) **Configuration 2:** For single davit arms of 12 feet and 16 feet reach only: Signal Head Mounting Style – Plumbizer:
- (i) Attachment on the 12 and 16 foot davit arm and plumbizer: One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 72 inches high - weight eighty (80) lbs. (mounted 29 inches from tenon centerline to top, 43 inches from tenon centerline to bottom) and
 - (ii) Attachment on the davit pole shaft: Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (iii) Attachment on the davit pole shaft: One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft: One traffic sign: dimensioned 36 inches wide x 12 inches high - weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
 - (v) Attachment on the davit pole shaft: One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign).
- (c) **Configuration 3:** For single davit arm of 8 feet reach only: Signal Head Mounting Style – Hanger:
- (i) Attachment on the 8 foot davit arm and hanger: One (3 section x 12 inch) signal head: dimensioned 14 inches wide x 42 inches high - weight fifty (50) lbs. (top of signal head mounted 8 inches below centerline of davit arm tenon) and
 - (ii) Attachment on the 8 foot davit arm:
Either
One street name sign: dimensioned 84 inches wide x 12 inches high – weight seventeen (17) lbs. (mounted 17.5 feet above base to bottom of sign)
Or
One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted next to the signal head).
 - (iii) Attachments on the davit pole shaft: If neither of item (ii) of davit arm attachments is used above, then;
Either
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 70 inches high – weight eighty (80) lbs. (bottom of signal head mounted 10 feet above base);
Or
One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft: One traffic sign: dimensioned 36 inches wide x 12 inches high - weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and

- (v) Attachment on the davit pole shaft: Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (vi) Attachment on the davit pole shaft: One traffic sign: dimensioned 24 inches wide x 12 inches high - weight eight (8) lbs. (mounted 11 feet above base to bottom of sign) and
 - (vii) Attachment on the davit pole shaft: One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign).
- (d) **Configuration 4:** For single davit arm of 8 feet reach only: Signal Head Mounting Style – Plumbizer:
- (i) Attachment on the 8 foot davit arm and plumbizer: One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 72 inches high - weight eighty (80) lbs. (mounted 29 inches from tenon centerline to top, 43 inches from tenon centerline to bottom) and
 - (ii) Attachment on the 8 foot davit arm:
Either
One street name sign: dimensioned 84 inches wide x 12 inches high – weight seventeen (17) lbs. (mounted 17.5 feet above base to bottom of sign),
Or
One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted next to the signal head).
 - (iii) on the davit pole shaft: If neither of item (ii) of davit arm attachments is used above, then,
Either
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 70 inches high - weight eighty (80) lbs. (mounted 10 feet above base to bottom of signal head);
Or
One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft: One traffic sign: dimensioned 24 inches wide x 12 inches high - weight eight (8) lbs. (mounted 11 feet above base to bottom of sign) and
 - (v) Attachment on the davit pole shaft: One traffic sign: dimensioned 36 inches wide x 12 inches high - weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
 - (vi) Attachment on the davit pole shaft: Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (vii) Attachment on the davit pole shaft: One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign).
- (e) **Configuration 5.** For Pedestrian Corridor Unit Mounting: Light duty davit pole shaft shall be designed to carry a pedestrian corridor unit (suspended from the end of a single davit arm of 12 feet maximum reach) dimensioned 36 ½ inches wide x 32 ½ inches high x 18 inches deep and four flashing lights, each dimensioned 10 inches wide x 10 inches high – total weight one hundred (100) lbs.
- (f) **Configuration 6.** For Pedestrian Corridor Unit Mounting: Light duty davit pole shaft shall be designed to support a double davit arm attachment (Drawing No. ST-136 R1) where individual arms are each of 12 feet maximum reach, 180 degrees apart. The double davit arms shall support two pedestrian corridor units only (per **Configuration 5** above).
- (g) **Configuration 7.** For Traffic Signal Mounting: Light duty davit pole shaft shall be designed to support a double davit arm attachment (Drawing No. ST-136 R1) where one arm is of 12

feet maximum reach and other arm is of 8 feet maximum reach, 180 degrees apart. The double davit arms shall support two (3 section x 12 inch) signal heads suspended from end of each arm. Each signal dimensioned 14 inches wide x 42 inches high – weight fifty (50) lbs each. Attachment on the davit pole shaft is one (5 section x 12 inch) signal head: dimensioned 14 inches wide x 70 inches high – weight eighty (80) lbs. (mounted 10 feet above base to bottom of signal).

E9. FABRICATION

- E9.1 Welding of steel structures shall be in accordance with the requirements of:
- (a) CSA W59-03 Welded Steel Construction (Metal Arc Welding);
 - (b) The fabricator shall be fully approved by the Canadian Welding Bureau (CWB) as per CSA W47.1-03 Certification of Companies for Fusion Welding of Steel.
- E9.2 All seams shall be continuously welded and free from any slag, splatter, or excess weld material.
- E9.3 The longitudinal seam weld shall be a minimum of 60% penetration, except that within 6 inches of base plate and 4 inches from upper end of shaft shall be complete penetration.
- NOTE:** A sixty (60) percent penetration longitudinal seam weld in the vicinity of the access panel will be acceptable, provided this seam weld does not intercept the circumference of the access panel.
- E9.4 Only one (1) longitudinal seam weld is permitted in each davit pole shaft.
- E9.5 Davit pole shaft shall be one continuous length with no circumferential butt joint welds.
- E9.6 The surface of exposed welds shall be free of any slag, splatter, and excess weld material.
- E9.7 The exterior of the pole; all openings (including areas accessible by hand) and surfaces of internal passages, through which cables will be routed, shall be free of burrs, sharp edges and points.

E10. TESTING

- E10.1 Notwithstanding the Contractor's own quality control testing of all materials, the Contract Administrator may arrange for inspection of welding procedures and steel fabrication to ascertain compliance with the Specifications and Drawings.
- E10.2 A testing agency may be engaged to work with the Contract Administrator to carry out shop inspections and fabrication testing of the work throughout the manufacturing process. The Contractor shall cooperate fully with the testing firm. The firm shall have access to all the Contractor's normal quality control records associated with this Contract.
- E10.3 Testing may include radiographic inspection and magnetic particle inspection, as determined by the Contract Administrator. Weld inspection will be carried out in accordance with the requirements of CSA W59-03. Welds found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59-03 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor. No repair shall be made until agreed to by the Contract Administrator

E11. PROTECTIVE COATING SYSTEMS

- E11.1 The sole approved protective coating system for the traffic signal light duty davit pole shaft is hot dip galvanizing.
- E11.2 Hot dip galvanizing shall be carried out in accordance with CSA Standard G164-M92 to a net minimum retention of 600 grams per square metre.

E11.3 After hot dip galvanizing, all sharp edges and shards of galvanizing material on exterior of pole shafts shall be removed. The same standard of care shall apply to all accessible interior surfaces.

E11.4 All areas of damaged galvanizing shall be repaired with self fluxing low temperature zinc based alloy rod. Use of spray on coatings is not acceptable.

E12. DESIGN FEATURES

E12.1 Each traffic signal light duty davit pole shaft shall be complete in all respects. Shaft shall be of shell type construction, octagonal in cross-section and uniformly tapered.

E12.2 **Base Plate:** Each davit pole shaft will be base mounted and therefore suitable for installation on a concrete foundation, break away base or on a steel screw-in base using 1 inch diameter anchor bolts or connecting bolts.

(a) Light duty davit pole shaft shall have base plate as shown on Drawing No. ST-161 R3 Sheet 1. The base plate shall be G40.21 44W steel, 1 inch thick, 12 inches square, having 1 3/8 inches wide slotted bolt holes designed to suit 1 inch diameter anchor bolts which are spaced on a bolt square ranging from 6 3/4 inches to 8 1/8 inches square (9 1/2 inches to 11 1/2 inches bolt circle). The base plate shall have an octagonal center opening slightly larger than 7 inches "across flats" into which the bottom portion of the pole shaft wall shall be inserted and welded. The base plate corners shall be chamfered 3/4 inch. Flame access slots (if necessary) shall radiate from the anchor bolt holes to the outer corners of the base plate and shall be 1/4 inch maximum width; and

(b) Pole shaft shall be welded to the base plate by means of both interior and exterior continuous circumferential fillet welds. The interior weld shall be ground smooth prior to applying the protective coating (galvanizing). The tolerance for alignment of the base plate to the pole shaft shall be plus or minus one inch at the top of the pole shaft from perpendicular to the base plate.

NOTE: Prior to shipping the final products, the manufacturer shall submit to the Contract Administrator copies of TS-RPD1 which is a table of measurements of the pole stub dimensions as described in E12.3(c) The sample size for this table shall not be less than 10 percent of the order of randomly selected and identified poles.

E12.3 **Davit Pole Shafts:** The davit pole shall consist of a straight shaft, which tapers uniformly from the base plate to the upper end of shaft.

(a) The davit pole shaft (Drawing No. ST-161 R3 Sheet 1) shall support a davit arm by means of a slip joint which permits feed through of internal wires.

NOTE: The davit arms currently in the City's stock must inter-mate with the light duty davit pole shafts being supplied.

(b) Overall height of the davit shaft from the top opening to the bottom of the base plate shall be 13 feet, +1, -0 inch;

(c) The exterior dimensions measured "across the flats" of the davit shaft, after welds are cleaned of slag, splatter and excess weld material. (but prior to galvanizing), shall be as follows:

(i) exterior dimensions "across flats" at top of the shaft shall be 4 5/16 inches +0, -1/8 inch; and

(ii) exterior dimensions "across flats" at the bottom of the shaft shall be 7 inches +0, -1/8 inch.

(d) Davit pole shafts shall have detailed, repeatable, close tolerance dimensions. The slip joint, at the top of the davit shafts, will make interchange-ability possible with davit arms currently in the City's stock.

(e) Each davit pole shaft must be able to accept eight (8) foot davit arms, twelve (12) foot davit arms, sixteen (16) foot davit arms and eight (8) and/or twelve (12) foot double davit arms.

E12.4 4 3/4 inch x 24 inch (38 Circuit) Wiring Access Panel: Each pole shall be provided with a 4 3/4 inches wide x 24 inches long (38 circuit) wiring access panel for termination of signal control cables. The (38 circuit) wiring access panel, upper and lower mounting brackets, removable terminal strip bracket and lower terminal strip bracket support arrangement is shown on attached Drawing No. ST-111 R2. The (38 circuit) wiring access panel shall be located at a height of 46 ± 2 inches [3 feet, 10 inches] measured from centerline of panel to bottom of base plate. The (38 circuit) access panel shall have a minimum clear opening of 4 3/4 inches wide x 24 inches long except at the corners (which are rounded as per Drawing No. ST-111 R2). The (38 circuit) access panel shall be fabricated either of one continuous length of steel plate formed into a ring and welded at the junction, or may be formed of two symmetrical halves welded at the top and bottom of the panel opening.

- (a) The (38 circuit) access panel shall contain a removable terminal strip bracket, of 1 1/4 inches wide by 7 GA thick steel, having 12 drilled and tapped* holes precisely located as specified on Drawing No. ST-111 R2 to accommodate both a 0.438 inch density double row 16 conductor terminal strip and a 0.438 inch density double row 22 conductor terminal strip. These 12 holes are located such that either the longer or the shorter terminal strip may be mounted higher or lower on the removable terminal strip bracket. The lower end of the removable terminal strip bracket shall be held captive by means of a lower terminal strip support bracket, serving as a retainer clip, welded across the interior flats near the bottom opening of the (38 circuit) access panel opening. A backing piece of 11 GA material, 1 inch wide shall be stitch welded to the back centerline of the removable terminal strip bracket as per Drawing No. ST-111 R2 to render the bracket more rigid.
- (b) Upper Mounting Bracket and the Electrical Grounding Bolt: An upper mounting bracket shall be provided with a 1/4 inch diameter x 1 1/2 inches long full-threaded Type 316 stainless steel grounding bolt and two stainless steel hexagonal nuts, for the connection of ground wire(s). The grounding bolt shall be installed in a drilled and tapped* hole as shown on the upper mounting bracket, its threaded portion facing outwards, and its head welded to the rear of the upper mounting bracket. The threads of the grounding bolt shall be kept clean and free of welding splatter etc. and shall either be protected during galvanizing, or rethreaded after. The upper mounting bracket shall have two 3/8" - 16 UNC (Unified Standard Coarse Thread) General Purpose U-type nuts installed (Auveco Part Number 10054, or equal). A lower mounting bracket shall also be installed as shown with one 3/8" - 16 UNC General Purpose U-type nut to fasten the access panel cover. Three U-type nuts are required: two fasten the access panel cover, the other secures the removable terminal strip mounting bracket to the upper mounting bracket. The three U-nuts must be installed after galvanizing. All three U-nuts shall be installed "edgewise" (that is, with the fold of the U-nut facing the side of the access panel ring, not facing the top or bottom of the ring). Three corresponding Type 316 stainless steel full-thread hexagonal head bolts (9/16 inch across flats) are required. Two (2) stainless steel full-thread hexagonal head bolts (9/16 inch across flats); both 3/8 inch diameter x 2 1/2 inches long shall fasten the cover to the wiring access panel. A stainless steel full-thread hexagonal head bolt (also 9/16 inch across flats), 3/8 inch diameter x 1 1/2 inches long shall secure the removable terminal strip bracket to the upper mounting bracket.
- (c) Prior to galvanizing, all sharp edges within the (38 circuit) access panel shall be ground smooth to eliminate any sharp edges or corners. The lower perimeter edge of the access panel ring, upper and lower mounting bracket and the removable terminal strip bracket shall be so treated.

***NOTE:** all tapped holes shall be checked / re-worked post-galvanizing for compliance to the dimensions shown in the pole specification for the mounting screw thread sizes.

E12.5 Cover for the (38 Circuit) Wiring Access Panel: The (38 circuit) access panel shall be provided with a flanged, weatherproof non-metal cover.

NOTE: *The galvanized access panel cover as detailed in Drawing No. ST-164, earlier revision is not to be supplied.*

- (a) The “non-metal” type access panel cover shall be strong, durable, resistant to impact damage by acts of vandalism, ultraviolet stabilized, tamper proof and not subject to breakage or deformation under temperatures ranging from -50° C to $+50^{\circ}$ C.
- (b) The intended function of the handhole cover is to:
 - (i) Prevent access to the interior of the handhole when secured with the supplied hex head bolts.
 - (ii) Prevent/limit the ingress of water, snow, or items.
 - (iii) Withstand acts of vandalism caused by impact, or prying.
 - (iv) Provide a service lifetime similar to the pole.
- (c) Must maintain integrity of cover when bolts tightly fasten the handhole cover to the pole.
- (d) The access panel cover material shall be a homogenous colour throughout. The cover material colour shall be similar to the galvanized pole. Painted covers are not acceptable.
- (e) The access panel cover shall have a smooth and continuous circumferential perimeter flange. When mounted, the flange shall overlap the outside edge of the access panel ring sufficient to prevent driven snow or rain entry into the access panel, even at 25.6 psf design wind pressure. The flange shall be located no greater than $\frac{1}{4}$ ” from the outside edge of the access panel ring. The flange depth shall be a minimum of $\frac{3}{4}$ ” on the left and right sides (greater is preferred) and $\frac{7}{16}$ ” on the top and bottom (greater is preferred). Flat covers will be rejected;
- (f) The cover shall have a smooth and continuous internally extruded ring. The ring shall be located between $\frac{1}{8}$ ” and $\frac{1}{4}$ ” from the inside of the clear opening of the pole’s access panel ring. The width and depth of the internal ring extrusion shall be sufficient as to provide rigidity to the cover, to channel rogue moisture away from the terminal strip, and not interfere with the mounting of the access cover. The ring shall have a maximum $\frac{5}{8}$ ” width and a maximum depth of $\frac{3}{8}$ ” and not less than $\frac{1}{4}$ ” depth.
- (g) Any additional extrusions into the pole access opening shall be limited to $\frac{3}{8}$ ”. Extrusions exterior to the plane of the access panel’s opening shall be limited to $\frac{3}{4}$ ” and shall be functional.
- (h) The cover shall bear down onto the access panel ring and lay flush against the entire perimeter of the access panel ring when the cover is attached;
- (i) The cover shall be fabricated of material with a minimum thickness of $\frac{1}{8}$ ”.
- (j) All edges on the cover shall be smooth;
- (k) The cover shall be secured to the access panel by two $\frac{3}{8}$ inch diameter by 2 $\frac{1}{2}$ inches long, fully threaded hexagonal head Type 316 stainless steel bolts (hex head bolts, 9/16 inch across flats), each bolt complete with tamper proof cup washer (Drawing No. ST-164 R1). The tamper proof cup washer shall have an internal diameter of 13/16 inch.
- (l) The two holes in the cover for the mounting bolts shall be circular, $\frac{1}{2}$ inch diameter and centered over the upper and lower bracket mounting holes both vertically and horizontally to match the U-nuts;
- (m) A label identifying the manufacturer and year of manufacture shall be permanently formed or etched into the inside face of the access panel cover with a minimum $\frac{3}{8}$ ” character height. The format is as follows:
 - (i) “**XX – YR**” - where “XX” shall be the abbreviation or logo of the Contractor’s firm, followed by “dash”, followed by the last two (2) digits of the year of manufacture
- (n) The Contractor shall install the access panel covers prior to final delivery;
- (o) Unless previously approved in E12.7, a sample of the proposed alternate cover shall be provided to the Contract Administrator for inspection prior to approval in accordance with B5.
- (p) No other logos or wordings shall be permitted on the exterior faces of the cover.

E12.6 Handhole Cover Impact Testing: The impact test represents a potential act of vandalism. The impact test involves dropping a pendulum consisting of a 10 lb weight, 6 foot arm, through a 90

degree arc to its lowest vertical resting point. The handhole cover will be cold soaked for 4 hours at - 30 degrees Celsius prior to testing. The 10 lb weight will move through the 6 foot radial arc and impact the centre of the handhole cover face which is affixed to the handhole opening on the signal pole using the supplied hex bolts (as illustrated in drawing TS-IMP1). After being struck one time, the handhole cover will be examined for deformation or cracking. The sample will be found unacceptable if cracking appears, or deformation that affects the required functionality as per (a)(b).

E12.7 **Approved Access Panel Covers:** The following “non-metal” products are approved provided they continue to meet all the specifications in section E12.5.

- (a) Valmont West Coast PVC Access Cover 2004 Drawing: 230 – CO - 5x25 – PVC
- (b) Patriot Sales Inc. Light Pole Access Cover Plate 2007 Drawing: PSI.09102007 Rev. A
- (c) Power-Lite Industries Inc. – PWL-11, latest revision.

E13. MANUFACTURER’S IDENTIFICATION

E13.1 Each pole shall be marked in a clearly legible form to identify **the manufacturer, the production year and the unique number of the pole manufactured that year**. Raised lettering shall be confined to the width of one “flat,” not less than 1 inch in height and shall be raised not less than 1/16 inch in weld metal at the following prescribed location:

- (a) External face of pole within twenty-four inches (24”) of the bottom of shaft.

E13.2 Format of the raised lettering markings shall be as follows:

- (a) “**XX – YR – ###**” - where “XX” shall be the abbreviation or logo of the manufacturer, followed by “dash”, followed by “YR” where “YR” shall be the last two (2) digits of the year of manufacture, followed by a “dash”, followed by “###” where “###” shall be a unique pole number starting with “001” and proceeding consecutively for each additional pole of that specific type during the year of manufacture.
- (b) The Contractor shall ensure that poles manufactured under separate orders from the same contract continue to follow the unique consecutive numbering format.

E14. 8 FOOT SINGLE AND DOUBLE, 12 FOOT SINGLE AND DOUBLE, AND 16 FOOT SINGLE DAVIT ARMS

E15. MATERIALS

E15.1 The Contractor shall supply and deliver traffic signal single and double davit arms:

- (a) Single davit arm of eight (8) foot horizontal reach
- (b) Single davit arm of twelve (12) foot horizontal reach
- (c) Single davit arm of sixteen (16) foot horizontal reach
- (d) Double davit with arms of eight (8) foot horizontal reaches
- (e) Double davit with arms of twelve (12) foot horizontal reaches

E15.2 The davit arms are suitable for use with current and future inventory of thirteen (13) foot light duty davit shaft poles.

E15.3 The octagonal single davit arms and double davit twelve (12) foot arm walls shall be fabricated from **seven (7) gauge** structural steel. The octagonal double davit 8 foot “extension arm” walls shall be fabricated from **eleven (11) gauge** structural steel. All meeting as a minimum the requirements of ASTM A570 Grade 50 (50 ksi Design Yield Strength).

NOTE: Steel shall not be acceptable unless the mill test certificate states the grade to be fifty (50) ksi minimum yield. Lower grade steel shall not be acceptable (despite favourable published

mill test yield results) and single davit arms or double davit arms fabricated without steel certification shall be rejected.

- E15.4 The **seven (7)** and **eleven (11)** gauge structural steel shall have silicon content less than or equal to 0.06 percent. Other components shall have silicon content controlled as required to prevent detrimental galvanizing effects.
- E15.5 For double davit arms, the flange plates shall be steel meeting the requirements of CSA G40.21 44W.
- E15.6 Nuts and bolts specified for the double davit arms shall be UNC-SAE Grade 5 steel.

E16. CERTIFIED DETAILED DRAWINGS:

- (a) The engineer certified detailed drawings include a material list and all dimensions and tolerances applicable to all critical dimensions. On the drawings, details are included for every element of the traffic signal light duty davit arms including:
- (i) single davit arms of eight (8), twelve (12) and sixteen (16) foot horizontal reach;
 - (ii) double davit arms of eight (8) and twelve (12) foot horizontal reach.

E17. CERTIFIED STRUCTURAL STRESS ANALYSIS:

- E17.1 The engineer certified structural stress analysis, of the traffic signal light duty single davit arms and double davit arms, includes calculations of stresses at the slip joint, other critical locations and deflections at end of tenon. Placements of all attachments to the arms and pole are as described in detail in E18.3 "Pole Attachment Configurations", Loading is prescribed in E18.1 "AASHTO Standards" and E18.2 "Wind Loading".
- E17.2 For the purposes of the stress analysis, the nominal spread of compatible single davit arms (horizontal reach), as shown on Drawing No. ST-169 R0, and as measured to the end of the octagonal section of the arm are: eight feet zero inches (8' 0"), twelve feet zero inches (12' 0"), and sixteen feet zero inches (16' 0").
- E17.3 The single davit arms as shown in Drawing No. ST-169 R0, are to have an eighteen (18°) degree rise section with a one (1') foot (nominal) straight level section at the end of the davit arm to provide for a tenon height of nineteen feet three inches (19' 3" / +3", -0") above the base of the pole for both the eight (8') and twelve (12') foot davit arms and twenty feet six inches (20' 6" / +3", -0") above the base of the pole for the sixteen (16) foot davit arms.
- E17.4 For the purposes of the stress analysis, the nominal spread of compatible double davit arms (horizontal reach), as shown on Drawing No. ST-136 R1, and as measured to centerline of vertical shaft to the end of the octagonal section of the arm are: eight feet zero inches (8' 0") twelve feet zero inches (12' 0") and sixteen feet zero inches (16' 0").
- E17.5 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B5.

E18. DESIGN STANDARDS

- E18.1 "**AASHTO Standard**": The traffic signal light duty single davit arms and double davit arms are designed in accordance with the 2001 4th edition and latest revisions of The American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals.
- E18.2 **Wind Loading**: The traffic signal light duty light duty single davit arms and double davit arms are designed to withstand design wind pressure $P_z = 0.00256 K_z G V_2 I_r C_d$ pounds per square foot, where $(0.00256 G V_2) = 25.6$ psf, K_z as per AASHTO table 3-5 except not less than 1.0, $I_r = 1.0$ for fifty (50) year design life and C_d as per AASHTO table 3-6. This pressure is applied to the davit arms pole, with specific signal head and sign attachments as and attachments as herein described in E18.3 "Pole Attachment Configurations".

E18.3 Pole Attachment Configurations: The light duty davit pole shafts, single davit arms and double davit arms are designed to support traffic signal heads, pedestrian corridor units and traffic signs when loaded as specified without distress. The structural design calculations and stress analysis take into account the following configuration of attachments to the light duty traffic signal davit pole shaft, single davit arms and double davit arms:

- (a) **Configuration 1:** for single davit arms of twelve (12) and sixteen (16) feet reach only:
Signal head mounting style – Hanger:
- (i) Attachment on the twelve (12) and sixteen (16) foot davit arm and hanger;
One (3-section x 12 inch) signal head: dimensioned 14 inches wide x 42 inches high – weight fifty (50) lbs. (top of signal head mounted 8 inches below centerline of davit arm tenon) and
 - (ii) Attachment on the davit pole shaft:
Two pedestrian heads at ninety (90°) degrees: each dimensioned 13 ½ inch wide x 13 ½ inch high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (iii) Attachment on the davit pole shaft:
On traffic sign: dimensioned 24 inches wide x 36 inches high) – weight fourteen (14) lbs. (mounted twelve (12) feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft:
One traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mounted ten (10') feet above base to bottom of sign) and
 - (v) Attachment on the davit pole shaft:
One traffic sign: dimensioned 5 inches wide x 8 inches high – weight five (5) lbs. (mounted 4 feet above base to bottom of sign)
- (b) **Configuration 2:** For single davit arms of twelve (12') feet and sixteen (16') feet reach only: Signal Head Mounting Style – Plumbizer:
- (i) Attachment on the 12 and 16 foot davit arm and plumbizer:
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 72 inches high – weight eighty (80) lbs. (mounted 29 inches from tenon centerline to top, 43 inches from tenon centerline to bottom) and
 - (ii) Attachment on the davit pole shaft:
Two (2) pedestrian heads at ninety (90°) degrees: each dimensioned 13 ½ inch wide x 13 ½ inch high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (iii) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 24 inches wide x 36 inches high – weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (iv) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mounted ten (10) feet above base to bottom of sign) and
 - (v) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 5 inches wide x 8 inches high – weight five (5) lbs. each (mounted four (4) feet above base to bottom of sign)
- (c) **Configuration 3:** For single davit arms of eight (8') feet reach only:
Signal Head Mounting Style – Hanger:
- (i) Attachment on the 8 foot davit arm and hanger:
One (3 section x 12 inch) signal head: dimensioned 14 inches wide x 42 inches high – weight fifty (50) lbs. (top of signal head mounted 8 inches below centerline of davit arm tenon) and
 - (ii) Attachment on the eight (8) foot davit arm:
Either –
One (1) street name sign: dimensioned 84 inches wide x 12 inches high – weight seventeen (17) lbs. (mounted 17.5 feet above base to bottom of sign)
Or –

- One (1) traffic sign: dimensioned 24 inches wide x 36 inches high: - weight fourteen (14) lbs. (mounted next to the signal head)
- (iii) Attachments on the davit pole shaft:
If neither of item (ii) of davit arm attachments is used above, then
Either –
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 70 inches high – weight eighty (80) lbs. (bottom of signal head mounted ten (10) feet above base)
Or –
One traffic sign: dimensioned 24 inches wide x 36 inches high – weight fourteen (14) lbs. (mounted twelve (12) feet above base to bottom of sign) and
- (iv) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mounted ten (10) feet above base to bottom of sign) and
- (v) Attachment on the davit pole shaft:
Two (2) pedestrian heads at ninety (90°) degrees: each dimensioned 13 ½ inch wide x 13 ½ inch high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
- (vi) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 24 inches wide x 12 inches high – weight eight (8) lbs. (mounted 11 feet above base to bottom of sign) and
- (vii) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 5 inches wide x 8 inches high – weight five (5) lbs. (mounted 4 feet above base to bottom of sign).
- (d) **Configuration 4:** For single davit arms of eight (8) feet reach only:
Signal Head Mounting Style – Plumbizer:
- (i) Attachment on the eight (8) foot davit arm and plumbizer:
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 72 inch high – weight eighty (80) lbs. (mounted 29 inches from tenon centerline to top, 43 inches from tenon centerline to bottom) and
- (ii) Attachment on the eight (8) foot davit arm:
Either –
One (1) street name sign: dimensioned 84 inches wide x 12 inches high – weight seventeen (17) lbs. (mounted 17.5 feet above base to bottom of sign)
Or –
One (1) traffic sign: dimensioned 24 inches wide x 36 inches high – weight fourteen (14) lbs. (mounted next to the signal head).
- (iii) Attachment on the davit pole shaft:
If neither of item (ii) of davit arm attachments is used above, then
Either –
One (5 section x 12 inch) signal head: dimensioned 14 inches wide by 70 inches high – weight eighty (80) lbs. (mounted 10 feet above base to bottom of signal head)
Or –
One (1) traffic signal: dimensioned 24 inches wide x 36 inches high – weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and;
- (iv) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 24 inches wide x 12 inches high – weight eight (8) lbs. (mounted 11 feet above base to bottom of sign) and;
- (v) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mount ten (10) feet above base to bottom of sign) and;
- (vi) Attachment on the davit pole shaft:
Two (2) pedestrian heads at 90 degrees: each dimensioned 13 ½ inch wide x 13 ½ inch high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and;

- (vii) Attachment on the davit pole shaft:
One (1) traffic sign: dimensioned 5 inches wide x 8 inches high – weight five (5) lbs.
(mounted four (4) feet above base to bottom of sign)
- (e) **Configuration 5:** For Pedestrian Corridor Unit Mounting:
Light duty single davit arms shall be designed to carry a pedestrian corridor unit (suspended from the end of a single davit arm of twelve (12) feet maximum reach) dimensioned 36 ½ inches wide x 32 ½ inches high x 18 inches deep and four flashing lights, each dimensioned 10 inches wide x 10 inches high – total weight one hundred (100) lbs.
- (f) **Configuration 6:** For pedestrian Corridor Unit Mounting:
Light duty double davit arms, one hundred and eighty (180°) degrees apart, shall be designed to each support a pedestrian corridor unit (suspended from the end of each davit arm of twelve (12) feet maximum reach) as per **Configuration 5** above.
- (g) **Configuration 7:** For Traffic Signal Mounting:
Light duty double davit arms, one hundred and eighty (180°) apart, where one arm is twelve (12) feet maximum reach and other arm is of eight (8) feet maximum reach, shall be designed to support a (3 section x 12 inch) signal head suspended from end of each arm. Each signal dimensioned 14 inches wide x 42 inches high – weight fifty (50) lbs.
Attachment on the davit pole shaft is one (5 section x 12 inch) signal head: dimensioned 14 inches wide x 70 inches high – weight eighty (80) lbs. (mounted ten (10) feet above base to bottom of signal).

E19. FABRICATION

- E19.1 Welding of steel structures shall be in accordance with the requirements of:
- (a) CSA W59-03 Welded Steel Construction (Metal Arc Welding);
 - (b) The fabricator shall be fully approved by the Canadian Welding Bureau as per CSA W47.1-03 Certification of Companies for Fusion Welding of Steel;
 - (c) All seams shall be continuously welded and free from any slag, splatter or excess weld materials;
 - (d) The longitudinal seam weld shall be a minimum of sixty (60%) percent penetration, excepting that within 4 ½ inches from the lower end of the davit arm and 3 inches from each arm flange shall be complete penetration;
 - (e) Only one (1) longitudinal seam weld is permitted in each davit arm;
 - (f) Davit arms shall be one continuous length with no circumferential butt joint welds;
 - (g) The surface of exposed welds shall be free of any slag, splatter and excess weld materials;
 - (h) All openings and surfaces of internal passages, through which cables will be routed, shall be free of burrs, sharp edges and points.

E20. TESTING

- E20.1 Notwithstanding the Contractor's own quality control testing of all materials, the Contract Administrator may arrange for inspection of welding procedures and steel fabrication to ascertain compliance with the Specifications and Drawings.
- E20.2 A testing agency may be engaged to work with the Contract Administrator to carry out shop inspections and fabrication testing of the work throughout the manufacturing process. The Contractor shall cooperate fully with the testing firm. The firm shall have access to all the Contractor's normal quality control records associated with this Contract.
- E20.3 Testing may include radiographic inspection and magnetic particle inspection, as determined by the Contract Administrator.

E20.4 Weld inspection will be carried out in accordance with the requirements of CSA W59-03. Welds found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59-03 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor. No repair shall be made until agreed to by the Contract Administrator.

E21. PROTECTIVE COATING SYSTEM

E21.1 The sole approved protective coating system for davit arms is hot dip galvanizing.

E21.2 Hot dip galvanizing shall be carried out in accordance with CSA Standard G164-M92 to a net minimum retention of 600 grams per square metre.

E21.3 After hot dip galvanizing all sharp edges and shards of galvanizing material on the exterior of arms shall be removed. The same standard of care shall apply to all accessible interior surfaces.

E21.4 All areas of damaged galvanizing shall be repaired with self-fluxing low temperature zinc based alloy rod. Use of spray-on coatings is not acceptable.

E22. DESIGN FEATURES

E22.1 Each traffic signal light duty single davit arm and double davit arm shall be complete in all respects. All arms shall be of shell-type construction, octagonal in cross-section and uniformly tapered.

(a) The longitudinal seam weld of the single davit arm and double davit arms shall be adjacent to the "flat" which is the "outermost" flat through the bend radius.

(b) Each davit shaft shall consist of a straight shaft, which tapers uniformly from the base plate to the upper end of shaft. The davit shaft supports a single davit arm or double davit arm, by means of a slip joint which permits feed through of internal wires.

(c) **NOTE:** The davit shafts currently in the City's stock must inter-mate with the single davit arm and double davit arms being supplied.

(d) The single davit arm and double davit arm will be terminated with a two (2) inch IPS pipe (tenon) projecting twelve (12) inches beyond the octagonal section of the arm. A ½ inch hole (**through tenon**) shall be placed 1 ¾ inches back from the end of the fourteen (14") inch long IPS pipe horizontally through the side centered on the pipe and square on all planes.

NOTE: Prior to shipping the final products, the manufacturer shall submit to the Contract Administrator completed copies of TS-RPD1 which is a table of measurements of the single davit arm intermating dimensions as described in E22.2(a) and the double davit arm intermating dimensions as described in E22.3(a) The sample size for this table shall not be less than 10 percent of the order of randomly selected and identified arms.

E22.2 **Single Davit Arms:** Davit arms shall have detailed, repeatable, close tolerance dimensions. The slip joint, at the bottom of the davit arms, will make interchange-ability possible with davit shafts currently in the City's stock.

(a) The exterior dimensions measured "across flats" at **bottom** of the davit arm (at slip joint) shall be **4-7/8 inches +0, -1/8 inch;**

(b) The exterior dimensions measured "across flats" at **top** of the davit arm (at tenon) shall be **2-7/8 inches +0, -1/8 inch.**

E22.3 **Double Davit Arms:** Double davit arms shall have detailed, repeatable, close tolerance dimensions. The slip joint, at the bottom of the double davit arms, will make interchange-ability possible with davit shafts currently in the City's stock.

- (a) The exterior dimensions measured “across flats” at **bottom** of the double davit arm (at slipjoint) shall be **4-7/8 inches +0, -1/8 inch**;
- (b) The exterior dimensions “across flats” at **flange** of double davit arms shall be **3-9/16 inches +0, -1/8 inch**;
- (c) The exterior dimensions “across flats” at **top** of 12 foot reach double davit arm (at tenon) shall be **2 7/8 inches +0, -1/8 inch** and at **top** of 8 foot reach double davit arm (at tenon) shall be **2 3/4 inches +0, -1/8 inch**;
- (d) The double davit arm will be manufactured in three parts as per Drawing No. ST-136 R1;
- (e) The flange plates will be manufactured from 3/4 inch thick, G40.21 Grade 44W, material 6 3/4 inches square. Each flange will be welded to arm with complete penetration groove welds.
- (f) Each pair of the mating flanges will be secured by means of four (4) UNC-SAE grade 5, 3/4” diameter hex head bolts, 3” long (accompanied by flat washers) with eight (8) UNC-SAE grade 5, 3/4” diameter heavy hex nuts, and eight (8) UNC-SAE grade 5, 3/4” diameter heavy jam nuts.
 - (i) All bolts, washers, and nuts **shall be hot dipped galvanized** and supplied with the arms for a total of 8 bolts, 8 washers, and 16 nuts for each double davit unit;
- (g) The double davit arms **will not** be shipped assembled.

E22.4 Care shall be taken to ensure that the quality of the bend on the davit arm consistently and uniformly meets the requirements of the specification and drawing(s) for rise and reach.

E23. MANUFACTURER’S IDENTIFICATION

E23.1 Each single davit arm and double davit arm shall be uniquely marked in a clearly legible form to identify **the manufacturer, the production year and arm number**. Raised letter marking shall be confined to the width of one “flat” **, be not less than 1 inch in height and shall be raised not less than 1/16 inch in weld metal at the following prescribed locations:

- (a) External face of single davit arm within eighteen inches (18”) of the bottom of arm;
- (b) External face of double davit arm within eighteen inches (18”) of the bottom of arm;
- (c) External face of eight foot (8’) and twelve foot (12’) “extension arms”, within twelve inches (12”) of the flange plate.

E23.2 Format of the raised lettering markings shall be as follows:

- (a) “**XX – YR - ###**” – where “XX” shall be the abbreviation or logo of the Contractor’s firm, followed by “dash”, followed by the last two (2) digits of the year of manufacture,** followed by “dash” followed by **###** which is the arm number starting with 001 and proceeding consecutively for each additional arm during the year of manufacture.
- (b) Each arm type (8, 12, and 16) shall start at 001 and be numbered consecutively.
- (c) The Contractor shall ensure that arms manufactured under separate orders from the same contract continue to follow the unique consecutive numbering format.

****NOTE:** Where there is insufficient room to position all raised letter markings on one face, the raised letter marking of the arm number (“###”) may be located on the external face of an adjacent “flat” as described in E23.1

E24. 35 FOOT SIGNALS STREETLIGHTING JOINT USE POLE

E25. MATERIALS

E25.1 The Contractor shall supply and delivery thirty-five (35) foot signals streetlight joint use pole shafts and davit arms that are suitable for use when intermated together.

E25.2 The octagonal signals streetlighting joint use pole shaft walls shall be fabricated from 7 gauge structural steel meeting as a minimum the requirements of ASTM A570 Grade 50 (50 ksi Design Yield Strength).

NOTE: Steel shall not be acceptable unless the mill test certificates state the grade to be 50 ksi minimum yield. Lower grade steel shall not be acceptable (despite favourable published mill test yield results) and signals streetlighting joint use pole shafts fabricated without steel certification shall be rejected

E25.3 The octagonal signals streetlighting joint use 10 foot streetlight davit arm walls shall be fabricated from 11 gauge structural steel meeting as a minimum the requirements of ASTM A570 Grade 50 (50 ksi Design Yield Strength).

NOTE: Steel shall not be acceptable unless the mill test certificates state the grade to be 50 ksi minimum yield. Lower grade steel shall not be acceptable (despite favourable published mill test yield results) and signals streetlighting joint use pole arms fabricated without steel certification shall be rejected.

E25.4 The 7 gauge and 11 gauge structural steel shall have silicon content less than or equal to 0.06 percent. Other components shall have silicon content controlled as required to prevent detrimental galvanizing effects

E25.5 Base plate material shall be steel meeting the requirements of CSA G40.21 44W.

E25.6 The upper access panel cover shall be non-metal.

E25.7 The lower handhole cover shall be minimum 11 gauge steel meeting the requirements of ASTM A570 Grade 50.

E25.8 Type 316 stainless steel (non-magnetic) hardware shall be used for:

- (a) The 3/8 inch by 1 inch long grounding bolt in the lower handhole, nut, flat washer and lock washer (Drawing No. ST-158 R1 Sheet 1);
- (b) The 3/8 inch diameter by 4 inches long lower handhole cover mounting bolt and nut (Drawing No. ST-163 R1);
- (c) The two 3/8 inch diameter by 2 ½ inches long cover mounting bolts, the 3/8 inch diameter by 1 ½ inches long terminal strip mounting bolt, the ¼ inch diameter by 1 ½ inches long grounding bolt and the two grounding bolt nuts associated with the wiring access panel (Drawing No. ST-164 R1 and Drawing No. ST-111 R2).

E25.8.1 Aluminum shall be used for the tamper-proof cup washers (Drawing No. ST-163 R1 and Drawing No. ST-164 R1), associated with the lower handhole cover and the wiring access panel cover.

E26. CERTIFIED DETAILED DRAWINGS

E26.1 The engineer certified detailed drawings include a material list and all dimensions and tolerances applicable to all critical dimensions. On the drawings, details are included for every element of the 35 foot signals streetlighting joint use poles, (the shaft and streetlight davit arm), including:

- (a) Base plate for the streetlighting joint use pole,
- (b) 4 3/4 inch x 12 inch lower handhole and cover,
- (c) 4 3/4 inch x 24 inch (38 circuit) access panel detail,
- (d) Removable terminal strip bracket/mounting bracket assemblies,
- (e) 4 3/4 inch x 24 inch access panel cover,
- (f) Tamper proof cup washer,
- (g) Overview of signals streetlighting joint use shaft and streetlight davit arm components.

NOTE: Clamp on traffic signal arms are not part of this Bid Opportunity.

E27. CERTIFIED STRUCTURAL STRESS ANALYSIS

E27.1 The engineer certified structural stress analysis, of the 35 foot traffic signals streetlighting joint use pole, includes calculations of stresses at the base of pole, lower handhole and access panel. Placement of all attachments to the signals streetlighting joint use pole are as described in detail in E28.3 "Pole Attachment Configurations". Loading is prescribed in E28.1 "AASHTO Standards" and E28.2 "Wind Loading".

E27.2 For the purposes of the stress analysis, the critical dimensions of the signals streetlighting joint use pole are contained in Drawing No. ST-158 R1 including the critical details of the 10 foot streetlight davit arm. An outline is shown of the two types of compatible traffic signal clamp on arms (not part of this Contract). The traffic signal clamp on arms can be assumed to have an eighteen (18) degree rise section for both 8 foot clamp on arm and for 12 foot clamp on arm. There is a one (1) foot (nominal) straight level section at the end of the clamp on arm to provide for a tenon height of nineteen feet, three inches (19'3"; +1", -0") above the base of the pole for either size (8 foot or 12 foot) clamp on arm. The clamp on arms attach to the 35 foot signals streetlighting joint use pole shafts as detailed in E28.3 "Pole Attachment Configurations".

E28. DESIGN STANDARDS

E28.1 **AASHTO Standards:** The 35 foot signals streetlighting joint use pole for use with traffic signal clamp on arms is designed in accordance with the 2001 4th edition and latest revisions of The American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

E28.2 **Wind Loading:** The 35 foot signals streetlighting joint use pole is designed to withstand design wind pressure $P_z = 0.00256 K_z G V^2 I_r C_d$ pounds per square foot, where $(0.00256 G V^2) = 25.6$ psf, K_z as per AASHTO table 3-5 except not less than 1.0, $I_r = 1.0$ for 50 year design life and C_d as per AASHTO table 3-6. This pressure is applied to the pole including clamp on arms, with specific signal head and sign attachments as herein described in 3.4 "Pole Attachment Configurations".

E28.3 **Pole Attachment Configurations:** The 35 foot signals streetlighting joint use pole is designed to support a streetlight luminaire on the 10 foot streetlight davit arm, as well as traffic signal heads and/or pedestrian corridor fixtures and traffic signs attached to the pole shaft and a traffic signal clamp on arm (not part of this Contract) when loaded as specified without distress. The structural design calculations and stress analysis takes into account the following configurations of attachments to the 35 foot signals streetlighting joint use pole (Drawing No. ST-158 R1 Sheet 2):

(a) **Configuration 1.** For a clamp on traffic signal arm of 12 foot reach:

- (i) Attachment on the 10 foot streetlight davit arm:
One (1) 250 watt streetlighting luminaire with effective projected wind load area of 2.15 sq. ft. – weight sixty (60) lbs. and
- (ii) Attachment on the signals streetlighting joint use pole shaft:
One 12 foot reach traffic signal clamp on arm, attached to the signals streetlighting joint use pole shaft. Top of arm flange
14 feet, 11 inches above the bottom of the base, to provide a signal head tenon mounting height of 19 feet, 3 inches above the bottom of the base - weight two hundred (200) lbs. and
- (iii) Attachment on the 12 foot traffic signal clamp on arm:
One (3 section x 12") signal head: dimensioned 14 inches wide x 42 inches high - weight fifty (50) lbs.

(top of signal head mounted 8 inches below centerline of clamp on arm tenon) One traffic sign: dimensioned 24 inches wide x 36 inches high – weight fourteen (14) lbs. (mounted next to the signal head) and

The following additional attachments are mounted on the 35' signals streetlighting joint use pole shaft:

- (iv) One (3 section x 12") signal head: dimensioned 14 inches wide x 42 inches high - weight fifty (50) lbs. (mounted 12 feet above base to bottom of the signal head) and
 - (v) Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head and 16 inches out from edge of pole) and
 - (vi) One traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
 - (vii) One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign)
- (b) **Configuration 2.** For a clamp on traffic signal arm of 12 foot reach:
- (i) Attachment on the 10 foot streetlight davit arm:
One (1) 250 watt streetlighting luminaire with effective projected wind load area of 2.15 sq. ft. - weight sixty (60) lbs. and
 - (ii) Attachment on the signals streetlighting joint use pole shaft:
One 12 foot reach traffic signal clamp on arm, attached to the signals streetlighting joint use pole shaft. Top of arm flange
14 feet 11 inches above the bottom of the base, to provide a signal head tenon mounting height of 19 feet 3 inches above the bottom of the base - weight two hundred (200) lbs. and
 - (iii) Attachment on the 12 foot traffic signal clamp on arm:
One (5 section x 12 inch) signal head: dimensioned 14 inches wide x 72 inches high -weight eighty (80) lbs.
(mounted 29 inches from tenon centerline to top, 43 inches from tenon centerline to bottom)
One street name sign: dimensioned 84 inches wide x 12 inches high – weight seventeen (17) lbs. (mounted 17.5 feet above base to bottom of sign and 10 feet 2 inches to outer edge of sign from centerline of shaft) and
- The following additional attachments are mounted on the 35' signals streetlighting joint use pole shaft:**
- (iv) One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
 - (v) Two pedestrian heads at 90 degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (mounted 8 feet 7 inches above base to bottom of head, and 16 inches out from edge of pole) and
 - (vi) One traffic sign: dimensioned 36 inches wide x 12 inches high – weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
 - (vii) One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign)
- (c) **Configuration 3.** For a clamp on traffic signal arm of 12 foot reach:
- (i) Attachment on the 10 foot streetlight davit arm:
One (1) 250 watt streetlighting luminaire with effective projected wind load area of 2.15 sq. ft.
- weight sixty (60) lbs. and
 - (ii) Attachment on the signals streetlighting joint use pole shaft:
One 12 foot reach traffic signal clamp on arm, attached to the signals streetlighting joint use pole shaft. Top of arm flange

14 feet 11 inches above the bottom of the base, to provide a signal head tenon mounting height of 19 feet 3 inches above the bottom of the base - weight two hundred (200) lbs. and

- (iii) Attachment on the 12 foot traffic signal clamp on arm:

One pedestrian corridor unit: dimensioned 36 ½ inches wide x 32 ½ inches high x 18 inches deep and four flashing lights, each dimensioned 10 inches wide x 10 inches high – total weight one hundred (100) lbs. (suspended from the end of clamp on arm) and

The following additional attachments are mounted on the 35' signals streetlighting joint-use pole shaft:

- (iv) One traffic sign: dimensioned 24 inches wide x 36 inches high - weight fourteen (14) lbs. (mounted 12 feet above base to bottom of sign) and
- (v) One traffic sign: dimensioned 36 inches wide x 12 inches high - weight ten (10) lbs. (mounted 10 feet above base to bottom of sign) and
- (vi) One traffic sign: dimensioned 5 inches wide x 8 inches high - weight five (5) lbs. (mounted 4 feet above base to bottom of sign).

E29. FABRICATION

E29.1 Welding of steel structures shall be in accordance with the requirements of:

- (a) CSA W59-03 Welded Steel Construction (Metal Arc Welding).
- (b) The fabricator shall be fully approved by the Canadian Welding Bureau as per CSA W47.1-03 Certification of Companies for Fusion Welding of Steel

E29.2 All seams shall be continuously welded and free from any slag, splatter, or excess weld material.

E29.3 The longitudinal seam weld shall be a minimum of 60% penetration, except that within 6 inches of lower end of shaft, 4 inches from upper end of shaft and 4 ½ inches from lower end of streetlight davit arm shall be complete penetration.

NOTE: A 60% penetration longitudinal seam weld in the vicinity of the lower handhole and the access panel will be acceptable, provided this seam weld does not intercept the circumference of the lower handhole and the circumference of the access panel.

E29.4 Only one longitudinal seam weld is permitted in each pole shaft and streetlight davit arm.

E29.5 Signals streetlighting pole shaft and streetlight davit arm shall be one continuous length with no circumferential butt joint welds.

E29.6 The surface of exposed welds shall be free of any slag, splatter, and excess weld material.

E29.7 All openings and surfaces of internal passages, through which cables will be routed, shall be free of burrs, sharp edges and points.

E30. TESTING

E30.1 Notwithstanding the Contractor's own quality control testing of all materials, the Contract Administrator may arrange for inspection of welding procedures and steel fabrication to ascertain compliance with the Specifications and Drawings.

E30.2 A testing agency may be engaged to work with the Contract Administrator to carry out shop inspections and fabrication testing of the Work throughout the manufacturing process. The Contractor shall cooperate fully with the testing firm. The firm shall have access to all the Contractor's normal quality control records associated with this Contract.

E30.3 Testing may include radiographic inspection and magnetic particle inspection, as determined by the Contract Administrator.

E30.4 Weld inspection will be carried out in accordance with the requirements of CSA W59-03. Welds found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59-03 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor. No repair shall be made until agreed to by the Contract Administrator.

E31. PROTECTIVE COATING SYSTEMS

E31.1 The sole approved protective coating system for 35 foot signals streetlighting joint use pole shafts and streetlight davit arms is hot dip galvanizing.

E31.2 Hot dip galvanizing shall be carried out in accordance with CSA Standard G164-M92 to a net minimum retention of 600 grams per square metre.

E31.3 After hot dip galvanizing, all sharp edges and shards of galvanizing material on exterior of pole shafts and arms shall be removed. The same standard of care shall apply to all accessible interior surfaces.

E31.4 All areas of damaged galvanizing shall be repaired with self fluxing low temperature zinc based alloy rod. Use of spray on coatings is not acceptable.

E32. DESIGN FEATURES

E32.1 Each 35 foot signals streetlighting joint use pole shaft and 10 foot reach streetlight davit arm shall be complete in all respects. Shafts and arms shall be of shell type construction, octagonal in cross section and uniformly tapered.

E32.2 **Base Plate:** Each signals streetlighting joint use pole will be base mounted and therefore suitable for installation on a concrete foundation, break away base or on a steel screw in base using 1 ¼ inch diameter anchor bolts or connecting bolts. On existing City of Winnipeg concrete bases with 1 inch diameter anchor bolts, load configurations on Drawing No. ST-158 R1 Sheet 3 shall be used.

(a) Signals streetlighting joint use pole shaft shall have base plate as shown on (Drawing No. ST-158 R1 Sheet 1). The base plate shall be G40.21 44W steel, 1 ¼ inch thick, 12 inches square, having 1 ½ inch diameter bolt holes designed to suit 1 ¼ inch diameter anchor bolts which are spaced on a 11 ½ inch bolt circle diameter. The base plate corners shall be chamfered ¾ inch. Flame access slots (if necessary) shall radiate from the anchor bolt holes to the outer corners of the base plate and shall be ¼ inch maximum width.

(b) Signals streetlighting joint use pole shaft shall be welded to the base plate by continuous full penetration groove weld with backing ring. The backing ring shall be welded to base plate with continuous fillet weld. The tolerance for alignment of the base plate to the joint use pole shaft shall be plus or minus one inch at the top of the shaft from the perpendicular centerline of the base plate.

E32.3 35 Foot Signals StreetLighting Joint Use Pole Shaft and Streetlight Davit Arm: The 35 foot signals streetlighting joint use pole shall consist of a straight shaft portion which tapers uniformly from the baseplate to the upper end of the shaft. The 35 foot signals streetlighting joint use pole shaft shall support a 10 foot streetlight davit arm by means of a slip joint which permits feed through of internal wires (Drawing No. ST-158 R1).

NOTE: Prior to shipping the final products, the manufacturer shall submit to the Contract Administrator copies of TS-RPD1 which is a table of measurements of the signals streetlighting joint use pole shaft dimensions as described in E32.3 (a)(ii) and the davit arm dimensions as described in E32.3 (a)(iii). The sample size for this table shall not be less than 10 percent of the order of randomly selected and identified poles and arms. (as indicated in Table E1.2 Table of External Documents)

- (a) The exterior dimensions measured “across the flats” of the 35 foot signals streetlighting joint use pole shaft and davit arm after welds are cleaned of slag, splatter and excess weld materials (but prior to galvanizing) shall be as follows:
- (i) Exterior dimensions "across flats" at **bottom** of the pole shaft shall be **8 inches +0, -1/8 inch**;
 - (ii) Exterior dimensions "across flats" at **top** of the pole shaft shall be **4 5/16 inches +0, -1/8 inch**;
 - (iii) Exterior dimensions "across flats" at **bottom** of the streetlight davit arm shall be **4 3/4 inches, +0, -1/8 inch**;
 - (iv) Exterior dimensions "across flats" at **top** of the streetlight davit arm shall be **2 3/4 inches, +0, -1/8 inch**.
- (b) The nominal spread (i.e. horizontal reach) of the streetlight davit arm, measured to the outer end of the tenon at the end of the octagonal portion of the arm, shall be ten feet (10' 0"). The 10 foot reach streetlight davit arm shall be terminated with a 2 inch IPS (2 3/8 inch outer diameter) pipe which shall project 8 1/4 inches beyond the octagonal section of the davit arm and be at an angle of 7 degrees above horizontal, when not bearing the weight of a streetlight luminaire. Streetlight davit arm shall have a radius bend of 7'-6", i.e. ninety (90) inches. The tenon of assembled signals streetlighting joint use pole davit arm shall be nominally thirty five (35) feet above the bottom of the base plate.
- (c) The 35 foot signals streetlighting joint use pole shaft and matching 10 foot streetlight davit arm shall have detailed, repeatable, close tolerance dimensions. The slip joint, at the top of the pole shaft, will make interchange-ability possible between signals streetlighting joint use pole shafts and 10 foot streetlight davit arms, whether provided under this Contract or those currently in the City's stock.
- (d) To ensure correct fit of the davit arm and the signals streetlighting joint use pole shaft, the top of all finished signals streetlighting joint use pole shafts shall fit into the 10 foot streetlight davit arms to an overlap distance of at least eight (8) inches and at most twelve (12) inches.
- (e) To ensure correct fit of the signals streetlighting joint use pole shaft and the davit arm, the bottom of all finished 10 foot streetlight davit arms shall overlap the signals streetlighting joint use pole shafts to an overlap distance of at least eight (8) inches and at most twelve (12) inches.
- (f) The longitudinal seam weld of the 10 foot streetlight davit arm shall be adjacent to the “flat” which is the “outermost” flat through the bend radius (Drawing No. ST-158 R1 identifies this as “Flat B”).
- (g) Finished 10 foot streetlight davit arm shall be symmetrical such that arm fits to finished shaft on any “flat to flat” angle (i.e. arm shall fit shafts at any of the eight (8) possible “flat to flat” mounting positions).
- (h) Overall height of the signals streetlighting joint use pole shaft from its top opening to bottom of the base plate shall be 25 feet, 6 inches (-0, +1 inch).
- (i) The total overall height of assembled signals streetlighting joint use pole with 10 foot streetlight davit arm shall be 35 feet (-0, + 6 inches).
- E32.4 4 3/4 inch x 24 inch (38 Circuit) Wiring Access Panel: Each pole shall be provided with a 4 3/4 inches wide x 24 inches long (38 circuit) wiring access panel for termination of signal control cables. The (38 circuit) wiring access panel, upper and lower mounting brackets, removable terminal strip bracket and lower terminal strip bracket support arrangement is shown on attached Drawing No. ST-111 R2. The (38 circuit) wiring access panel shall be located at a height of 46 ± 2 inches [3 feet, 10 inches] measured from centerline of panel to bottom of base plate.
- E32.4.1 The (38 circuit) access panel shall have a minimum clear opening of 4 3/4 inches wide x 24 inches long except at the corners (which are rounded as per Drawing No. ST-111 R2). The (38 circuit) access panel ring shall be fabricated either of one continuous length of steel

plate formed into a ring and welded at the junction, or may be formed of two symmetrical halves welded at the top and bottom of the panel opening.

- (a) The (38 circuit) access panel shall contain a removable terminal strip bracket, of 1 ¼ inches wide by 7 GA thick steel, having 12 drilled and tapped* holes precisely located as specified on Drawing No. ST-111 R2 to accommodate both a 0.438 inch density double row 16 conductor terminal strip and a 0.438 inch density double row 22 conductor terminal strip. These 12 holes are located such that either the longer or the shorter terminal strip may be mounted higher or lower on the removable terminal strip bracket. The lower end of the removable terminal strip bracket shall be held captive by means of a lower terminal strip support bracket, serving as a retainer clip, welded across the interior flats near the bottom of the (38 circuit) access panel opening. A backing piece of 11 GA material, 1 inch wide shall be stitch welded to the back centerline of the removable terminal strip bracket as per Drawing No. ST-111 R2 to render the bracket more rigid.
- (b) Upper Mounting Bracket and the Electrical Grounding Bolt: An upper mounting bracket shall be provided with a ¼ inch diameter x 1 ½ inches long full-threaded Type 316 stainless steel grounding bolt and two stainless steel hexagonal nuts, for the connection of ground wire(s). The grounding bolt shall be installed in a drilled and tapped* hole as shown on the upper mounting bracket, its threaded portion facing outwards, and its head welded to the rear of the upper mounting bracket. The threads of the grounding bolt shall be kept clean and free of welding splatter etc. and shall either be protected during galvanizing, or rethreaded after.
 - (i) The upper mounting bracket shall have two 3/8" - 16 UNC (Unified Standard Coarse Thread) General Purpose U-type nuts installed (Auveco Part Number 10054, or equal). A lower mounting bracket shall also be installed as shown with one 3/8" - 16 UNC General Purpose U -type nut to fasten the access panel cover.
 - (ii) Three U-type nuts are required: two to fasten the access panel cover, the other secures the removable terminal strip mounting bracket to the upper mounting bracket. The three U-nuts must be installed after galvanizing. All three U-nuts shall be installed "edgewise" (that is, with the fold of the U-nut facing the side of the access panel ring, not facing the top or bottom of the ring).
 - (iii) Three corresponding Type 316 stainless steel full-thread hexagonal head bolts (9/16 inch across flats) are required. Two stainless steel full-thread hexagonal head bolts (9/16 inch across flats), both 3/8 inch diameter x 2 1/2 inches long shall fasten the cover to the wiring access panel. A stainless steel full-thread hexagonal head bolt (also 9/16 inch across flats), 3/8 inch diameter x 1 ½ inches long shall secure the removable terminal strip bracket to the upper mounting bracket.

Prior to galvanizing, all sharp edges within the (38 circuit) access panel shall be ground smooth to eliminate any sharp edges or corners. The lower perimeter edge of the access panel ring, upper and lower mounting bracket and the removable terminal strip bracket shall be so treated.

***NOTE:** all tapped holes shall be checked / re-worked post-galvanizing for compliance to the dimensions shown in the pole specification for the mounting screw thread sizes.

E32.5 Cover for the (38 Circuit) Upper (Wiring) Access Panel: The (38 circuit) upper access panel shall be provided with a flanged, weatherproof non-metal cover.

NOTE: *The galvanized access panel cover as detailed in Drawing No. ST-164, earlier revision is not to be supplied.*

- (a) The "non-metal" type access panel cover shall be strong, durable, resistant to impact damage by acts of vandalism, ultraviolet stabilized, tamper proof and not subject to breakage or deformation under temperatures ranging from -50° C to +50° C.
- (b) The intended function of the handhole cover is to:

- (i) Prevent access to the interior of the handhole when secured with the supplied hex head bolts.
 - (ii) Prevent/limit the ingress of water, snow, or items.
 - (iii) Withstand acts of vandalism caused by impact, or prying.
 - (iv) Provide a service lifetime similar to the pole.
- (c) Must maintain integrity of cover when bolts tightly fasten the handhole cover to the pole.
- (d) The upper access panel cover material shall be a homogenous colour throughout. The upper access panel cover material colour shall be similar to the galvanized pole. Painted access panel covers are not acceptable.
- (e) The upper access panel cover shall have a smooth and continuous circumferential perimeter flange. When mounted, the flange shall overlap the outside edge of the access panel ring sufficient to prevent driven snow or rain entry into the access panel, even at 25.6 psf design wind pressure. The flange shall be located no greater than $\frac{1}{4}$ " from the outside edge of the access panel ring. The flange depth shall be a minimum of $\frac{3}{4}$ " on the left and right sides (greater is preferred) and $\frac{7}{16}$ " on the top and bottom (greater is preferred). Flat covers will be rejected;
- (f) The upper access panel cover shall have a smooth and continuous internally extruded ring. The ring shall be located between $\frac{1}{8}$ " and $\frac{1}{4}$ " from the inside of the clear opening of the pole's access panel ring. The width and depth of the internal ring extrusion shall be sufficient as to provide rigidity to the cover, to channel rogue moisture away from the terminal strip, and not interfere with the mounting of the access cover. The ring shall have a maximum $\frac{5}{8}$ " width and a maximum depth of $\frac{3}{8}$ " and not less than $\frac{1}{4}$ " depth.
- (g) Any additional extrusions into the pole access opening shall be limited to $\frac{3}{8}$ ". Extrusions exterior to the plane of the access panel's opening shall be limited to $\frac{3}{4}$ " and shall be functional.
- (h) The upper access panel cover shall bear down onto the access panel ring and lay flush against the entire perimeter of the access panel ring when the cover is attached;
- (i) The upper access panel cover shall be fabricated of material with a minimum thickness of $\frac{1}{8}$ ".
- (j) All edges on the upper access panel cover shall be smooth;
- (k) The upper access panel cover shall be secured to the access panel by two $\frac{3}{8}$ inch diameter by 2 $\frac{1}{2}$ inches long, fully threaded hexagonal head Type 316 stainless steel bolts (hex head bolts, $\frac{9}{16}$ inch across flats), each bolt complete with tamper proof cup washer (Drawing No. ST-164 R1). The tamper proof cup washer shall have an internal diameter of $\frac{13}{16}$ inch.
- (l) The two holes in the upper access panel cover for the mounting bolts shall be circular, $\frac{1}{2}$ inch diameter and centered over the upper and lower bracket mounting holes both vertically and horizontally to match the U-nuts;
- (m) A label identifying the manufacturer and year of manufacture shall be permanently formed or etched into the inside face of the upper access panel cover with a minimum $\frac{3}{8}$ " character height. The format is as follows:
- (i) "**XX – YR**" - where "XX" shall be the abbreviation or logo of the Contractor's firm, followed by "dash", followed by the last two (2) digits of the year of manufacture
- (n) The Contractor shall install the upper access panel covers prior to final delivery;
- (o) Unless previously approved in E32.7, a sample of the proposed alternate upper access panel cover shall be provided to the Contract Administrator for inspection prior to approval in accordance with B5.
- (p) No other logos or wordings shall be permitted on the exterior faces of the cover.

E32.6 Handhole Cover Impact Testing: The impact test represents a potential act of vandalism. The impact test involves dropping a pendulum consisting of a 10 lb weight, 6 foot arm, through a 90 degree arc to its lowest vertical resting point. The handhole cover will be cold soaked for 4

hours at - 30 degrees Celsius prior to testing. The 10 lb weight will move through the 6 foot radial arc and impact the centre of the handhole cover face which is affixed to the handhole opening on the signal pole using the supplied hex bolts (as illustrated in drawing TS-IMP1). After being struck one time, the handhole cover will be examined for deformation or cracking. The sample will be found unacceptable if cracking appears, or deformation that affects the required functionality as per E32.5(b).

E32.7 Approved Upper Access Panel Covers: The following “non-metal” products are approved provided they continue to meet all the specifications in section E12.4.

- (a) Valmont West Coast PVC Access Cover 2004 Drawing: 230 – CO - 5x25 – PVC
- (b) Patriot Sales Inc. Light Pole Access Cover Plate 2007 Drawing: PSI.09102007 Rev. A
- (c) Power-Lite Industries – PWL-11, latest revision.

E32.8 4 3/4 inch x 12 inch Lower Handhole: Each 35 foot signals streetlighting joint use pole shall be provided with a 4 3/4 inch wide x 12 inch long lower handhole for termination of streetlighting cables. The lower handhole shall be located at a height of 12 ± 2 inches (centerline of handhole to underside of base plate) and centered on the same flat as the (38 circuit) wiring access panel. The lower handhole shall have a minimum clear opening of 4 3/4 inches wide by 12 inches long, except the corners are rounded as per Drawing No. ST-163 R1. The lower handhole ring shall be fabricated either of one continuous length of steel plate, 3/8 inch thick and 2 1/2 inches wide, formed into a ring and welded at the junction, or may be formed of two symmetrical halves welded at the top and bottom of the handhole opening. The lower handhole ring shall be welded into the pole shaft such that the outer edge of the handhole ring shall project out 1/2 inch from the flat within which the handhole is centered. Prior to galvanizing, all edges within the lower handhole shall be ground smooth to eliminate sharp edges or corners.

- (a) **Lower Handhole Cover:** The lower handhole shall be provided with a flanged, weatherproof cover secured by one 3/8 inch diameter by 4 inches long fully-threaded Grade 316 stainless steel bolt complete with aluminum cup type tamper proof washer, nut and a steel clamp bar. The aluminum tamper proof cup washer shall conform to Drawing No. ST-163 R1. The clamp bar shall be a 1/4 inch thick galvanized flat steel plate, 1 3/4 inches wide and 14 inches long and shall have a drilled hole in its center with 3/8 stainless steel nut welded on to hold captive the 4 inches long bolt. The lower handhole cover shall have smooth, continuous perimeter edges. The Contractor shall grind smooth any rough edges on the cover. Cover and clamp bar shall have both interior and exterior surfaces galvanized. The Contractor shall install the cover after the poles have been galvanized and after installation of nut and washers on the pole grounding bolt as described in E32.9, prior to delivery.

E32.9 Pole Grounding Bolt: To provide internal connection for grounding conductors, a 3/8 inch diameter by 1 inch long Type 316 stainless steel bolt shall be welded to protrude from the inner shaft wall, on the flat immediately opposite the center of the lower hand hole opening. The pole grounding bolt shall be fully threaded. The contractor shall install a stainless steel nut, one stainless steel flat washer and one stainless steel lock washer to the grounding bolt after the pole and grounding bolt, has been galvanized and prior to delivery.

E33. MANUFACTURERS IDENTIFICATION

E33.1 Each 35 foot signals streetlighting joint use pole shaft and streetlight davit arm shall be marked in a clearly legible form to identify **the manufacturer, the production year, and pole number**. Raised lettering shall be not less than 1 inch in height, confined to one flat and shall be raised not less than 1/16 inch in weld metal at the following prescribed location:

- (a) Signals streetlighting joint use pole shaft: External face of shaft within twenty-four inches (24”) of the bottom of shaft.
- (b) Streetlight davit arm: External face of arm within eighteen inches (18”) of the bottom of davit arm.

E33.2 Format of the raised lettering markings shall be as follows:

- (a) “**XX – YR - ###**” - where “XX” shall be the abbreviation or logo of the Contractor’s firm, followed by “dash”, followed by the last 2 digits of the year of manufacture, followed by “dash” followed by ### which is the pole number starting with 001 and proceeding consecutively for each additional pole during the year of manufacture, and similarly with the streetlight davit arms starting with 001 and proceeding consecutively for each additional arm.
- (b) The Contractor shall ensure that poles manufactured under separate orders from the same contract continue to follow the unique consecutive numbering format.

E34. 18 FOOT STRAIGHT SHAFT POLES

E35. MATERIALS

E35.1 The Contractor shall supply and deliver traffic signal light duty straight shaft poles of eighteen (18) feet in height.

E35.2 The octagonal pole shaft walls shall be fabricated from **11 gauge** structural steel meeting as a minimum the requirements of ASTM A570 Grade 50 (50 ksi Design Yield Strength).

NOTE: Steel shall not be acceptable unless the mill test certificate states the grade to be 50 ksi minimum yield. Lower grade steel shall not be acceptable (despite favourable published mill test yield results) and pole shafts fabricated without steel certification shall be rejected.

E35.3 The structural steel shaft shall have silicon content less than or equal to 0.06 percent. Other components shall have silicon content controlled as required to prevent detrimental galvanizing effects.

E35.4 The base plate material shall be steel meeting the requirements of CSA G40.21 44W.

E35.5 The access panel cover shall be **non-metal**.

E35.6 Type 316 stainless steel (non-magnetic) hardware shall be used for:

- (a) The ¼ inch x 1 ½ inches long grounding bolt and the two grounding bolt nuts inside the access panel;
- (b) The two 3/8 inch x 2 ½ inches long hex head bolts which fasten the access panel cover to the wiring access panel;
- (c) The 3/8 inch x 1 ½ inches long hex head bolt which secures the removable terminal strip bracket to the upper mounting bracket within the wiring access panel.

E35.7 Aluminum shall be used for the tamper-proof cup washers Drawing No. ST-164 R1, associated with the wiring access panel.

E36. CERTIFIED DETAILED DRAWINGS

E36.1 The engineer certified detailed drawings include a material list and all dimensions and tolerances applicable to all critical dimensions. On the drawings, details are included for every element of the traffic signal light duty straight shaft pole, including:

- (a) Base plate;
- (b) 4 ¾ inch x 24 inch (38 circuit) access panel detail;
- (c) Removable terminal strip bracket/mounting bracket assemblies;
- (d) 4 ¾ inch x 24 inch access panel cover;
- (e) Tamper proof cup washer;
- (f) Octagonal top plate for eighteen (18) foot pole.

E37. CERTIFIED STRUCTURAL STRESS ANALYSIS

E37.1 The engineer certified structural stress analysis of the traffic signal light duty straight shaft pole of eighteen (18) feet in height, includes calculations of stresses at the base of the pole and at the access panel. Placement of all attachments to the pole are as described in detail in E38.3 "Pole Attachment Configuration". Loading is prescribed in E38.1 "AASHTO Standards" and E38.2 "Wind Loading"

E38. DESIGN STANDARDS

E38.1 **AASHTO Standards:** The traffic signal light duty straight shaft pole of eighteen (18) feet in height is designed in accordance with the 2001 4th edition and latest revisions of The American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals.

E38.2 **Wind Loading:** The traffic signal light duty straight shaft pole of eighteen (18) feet in height is designed to withstand design wind pressure $P_z = 0.00256 K_z G V_z I_r C_d$ pounds per square foot, where $(0.00256 G V_z) = 25.6$ psf, K_z as per AASHTO table 3-5 except not less than 1.0, $I_r = 1.0$ for fifty (50) year design life and C_d as per AASHTO table 3-6. This pressure is applied to the pole and attachments as herein described in E38.3 "Pole Attachment Configurations".

E38.3 **Pole Attachment Configuration:** The light duty straight shaft pole of eighteen (18) feet in height is designed to support traffic signal heads and traffic sign when loaded as specified without distress. The structural design calculations and stress analysis take into account the following configuration of attachments to the light duty traffic signal straight shaft pole of eighteen (18) feet in height as shown on Sheet 2 of Drawing No. ST-166 R2.

- (a) One (5 section x 12 inch) signal head: "Side Mount", dimensioned 14 inches wide x 70 inches high – weight eighty (80) lbs. (mounted with top of signal head at top of pole and sixteen (16') inches out from edge of pole); and
- (b) Two pedestrian heads at ninety (90) degrees: each dimensioned 13 ½ inches wide x 13 ½ inches high – total weight fifty (50) lbs. (each mounted 8 feet 7 inches above base to bottom of heads and each 16 inches out from edge of pole); and
- (c) One traffic sign: dimensioned 24 inches wide x 24 inches high – weight fourteen (14) lbs. (mounted 5 feet, 11 inches above base to bottom of sign).

E39. FABRICATION

E39.1 Welding of steel structures shall be in accordance with the requirements of:

- (a) CSA W59-03 Welded Steel Construction (Metal Arc Welding); and
- (b) The Fabricator shall be fully approved by the Canadian Welding Bureau as per CSA W47.1-03 Certification of Companies for Fusion Welding of Steel.

E39.2 All seams shall be continuously welded and free from any slag, splatter or excess weld materials.

E39.3 The longitudinal seam weld shall be a minimum of sixty (60%) percent penetration, excepting that within six (6) inches of base plate and four (4) inches from upper end of shaft shall be complete penetration.

NOTE: A sixty (60%) percent penetration longitudinal seam weld in the vicinity of the access panel will be acceptable, provided this seam weld does not intercept the circumference of the access panel.

E39.4 Only one (1) longitudinal seam weld is permitted in each pole shaft.

E39.5 Pole shaft shall be one continuous length with no circumferential butt joint welds.

E39.6 The surface of exposed welds shall be free of any slag or splatter and excess weld materials.

E39.7 All openings and surfaces of internal passages, through which cables will be routed, shall be free of burrs, sharp edges and points.

E40. TESTING

E40.1 Notwithstanding the Contractor's own quality control testing of all materials, the Contract Administrator may arrange for inspection of welding procedures and steel fabrication to ascertain compliance with the Specifications and Drawings.

E40.2 A testing agency may be engaged to work with the Contract Administrator to carry out shop inspections and fabrication testing of the work throughout the manufacturing process. The Contractor shall cooperate fully with the testing firm. The firm shall have access to all the Contractor's normal quality control records associated with this Contract.

E40.3 Testing may include radiographic inspection and magnetic particle inspection, as determined by the Contract Administrator.

E40.4 Weld inspection will be carried out in accordance with the requirements of CSA W59-03. Welds found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59-03 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor. No repair shall be made until agreed to by the Contract Administrator.

E41. PROTECTIVE COATING SYSTEM

E41.1 The sole approved protective coating system for traffic signal eighteen (18) foot poles is hot dip galvanizing.

E41.2 Hot dip galvanizing shall be carried out in accordance with CSA Standard G164-M92 to a net minimum retention of six hundred (600) grams per square metre.

E41.3 After hot dip galvanizing, all sharp edges and shards of galvanizing material on exterior of pole shafts shall be removed. The same standard of care shall apply to all accessible interior surfaces.

E41.4 All areas of damaged galvanizing shall be repaired with self fluxing low temperature zinc based alloy rod. Use of spray-on coatings is not acceptable.

E42. DESIGN FEATURES

E42.1 Each traffic signal light duty straight shaft pole of eighteen (18) feet in height shall be complete in all respects. Shafts shall be of shell type construction, octagonal in cross section and uniformly tapered.

E42.2 **Base Plate:** Each pole shaft will be base mounted and therefore suitable for installation on a concrete foundation, break away base or on a steel screw-in base using 1 inch diameter anchor bolts or connecting bolts.

(a) Light duty straight shaft pole of eighteen (18) feet in height shall have base plate as shown on Drawing No. ST-166 R2. The base plate shall be G40.21 44W steel, 1 inch thick, 12 inches square, having 1 3/8 inches wide slotted bolt holes designed to suit 1 inch diameter anchor bolts which are spaced on a bolt square ranging from 6 3/4 inches to 8 1/8 inches square (9 1/2 inches to 11 1/2 inches bolt circle diameter). The base plate shall have an octagonal center opening slightly larger than 7 inches "across flats" into which the bottom portion of the pole shaft wall shall be inserted and welded. The base plate corners shall be chamfered 3/4 inch. Flame access slots (if necessary) shall radiate from the anchor bolt holes to the outer corners of the base plate and shall be 1/4 inch maximum width; and

(b) Pole shaft shall be welded to the base plate by means of both interior and exterior continuous circumferential fillet welds. The interior weld shall be ground smooth prior to applying the protective coating (galvanizing). The tolerance for alignment of the base plate

to the pole shaft shall be plus or minus one inch at the top of the pole shaft from perpendicular to the base plate.

- E42.3 Eighteen (18) foot high straight shaft pole shall consist of a straight shaft, which tapers uniformly from the base plate to the top plate.
- (a) Overall height of the pole from top surface of the top plate to the bottom of the base plate shall be eighteen (18) feet, ± 1 inch.
 - (b) The exterior dimensions of the eighteen (18) foot pole shaft walls measured "across the flats" shall be as follows:
 - (i) exterior dimensions "across flats" at **top** of the shaft (at top plate) shall be $5 \frac{1}{2}$ inches + 0, - $\frac{1}{8}$ inch;
 - (ii) exterior dimensions "across flats" at **bottom** of the shaft (at base plate) shall be 7 inches + 0, - $\frac{1}{8}$ inch.
 - (c) At the top of each eighteen (18) foot straight shaft pole shall be a top plate made of $\frac{1}{2}$ inch steel plate. The top plate shall be octagonal in shape and slightly small than the "across the flats" distance at the top of the shaft. The top plate shall be welded circumferentially to the top of the shaft so as to completely seal the top as per Drawing No. ST-166 R2.
 - (d) Each eighteen (18) foot tall straight shaft pole shall be provided with a cable entry hole, complete with a protective rubber grommet. The inside diameter of the rubber grommet shall be $1 \frac{1}{4}$ inches. The cable entry hole shall be centered on the pole "flat" 180 degrees opposite the (38 circuit) wiring access panel. The cable entry hole shall be located at a height of 12 feet ± 2 inches above the bottom of the base plate.
 - (e) To facilitate the galvanizing process each straight shaft pole of 18 feet in height shall have two (2) circular vent holes, $\frac{1}{2}$ inch diameter, drilled below the top plate (located as per Drawing No. ST-166 R2). After galvanizing and prior to shipping the poles, the Contractor shall install metal or PVC "knockout plugs" to seal the vent holes.
- E42.4 **4 3/4 inch x 24 inch (38 Circuit) Wiring Access Panel:** each pole shall be provided with a $4 \frac{3}{4}$ inches wide x 24 inches long (38 circuit) wiring access panel for termination of signal control cables. The (38 circuit) wiring access panel, upper and lower mounting brackets, removable terminal strip bracket and lower terminal strip bracket support arrangement is shown on attached Drawing No. ST-111 R2. The (38 circuit) wiring access panel shall be located at a height of 46 ± 2 inches [3 foot, 10 inches] measured from centerline of panel to bottom of base plate. The (38 circuit) access panel shall have a minimum clear opening of $4 \frac{3}{4}$ inches wide by 24 inches long except at the corners (which are rounded as per Drawing No. ST-111 R2). The (38 circuit) access panel ring shall be fabricated either of one continuous length of steel plate formed into a ring and welded at the junction, or may be formed of two symmetrical halves welded at the top and bottom of the panel opening.
- (a) The (38 circuit) access panel shall contain a removable terminal strip bracket, of $1 \frac{1}{4}$ inches wide by 7 GA thick steel, having 12 drilled and tapped holes precisely located as specified on Drawing No. ST-111 R2, to accommodate both a 0.438 inch density double row 16 conductor terminal strip and a 0.438 inch density double row 22 conductor terminal strip. These 12 holes are located such that either the longer or the shorter terminal strip may be mounted higher or lower on the removable terminal strip bracket. The lower end of the removable terminal strip bracket shall be held captive by means of a lower terminal strip support bracket, serving as a retainer clip, welded across the interior flats near the bottom of the (38 circuit) access panel opening. A backing piece of 11 GA material, 1 inch wide shall be stitch welded to the back centerline of the removable terminal strip bracket as per Drawing No. ST-111 R2, to render the bracket more rigid;
 - (b) **Upper Mounting Bracket and the Electrical Grounding Bolt:** An upper mounting bracket shall be provided with a $\frac{1}{4}$ inch diameter by $1 \frac{1}{2}$ inches long full threaded Type 316 stainless steel grounding bolt and two stainless steel hexagonal nuts, for the connection of ground wire(s). The grounding bolt shall be installed in a drilled and tapped hole as shown on the upper mounting bracket, its threaded portion facing outwards, and its head **welded** to the rear of the upper mounting bracket. The threads of the grounding bolt shall be kept clean and free of welding splatter etc. and shall either be protected during galvanizing, or

rethreaded after. The upper mounting bracket shall have two 3/8" - 16 UNC (Unified Standard Coarse Thread) General Purpose U-type nuts installed (Auveco Part Number 10054, or equal). A lower mounting bracket shall also be installed as shown with one 3/8" - 16 UNC General Purpose U-type nut to fasten the access panel cover. Three U-type nuts are required: two to fasten the access panel cover, the other secures the removable terminal strip mounting bracket to the upper mounting bracket. The three U nuts must be installed after galvanizing. All three U-nuts shall be installed "edgewise" (that is, with the fold of the U-nut facing the side of the access panel ring, not facing the top or bottom of the ring). Three corresponding Type 316 stainless steel full-thread hexagonal head bolts (9/16 inch across flats) are required. Two stainless steel full thread hexagonal head bolts (9/16 inch across flats), both 3/8 inch diameter by 2 1/2 inches long shall fasten the cover to the wiring access panel. A stainless steel full-thread hexagonal head bolt (also 9/16 inch across flats), 3/8 inch diameter by 1 1/2 inches long shall secure the removable terminal strip bracket to the upper mounting bracket; and

- (c) Prior to galvanizing, all sharp edges within the (38 circuit) access panel shall be ground smooth to eliminate any sharp edges or corners. The lower perimeter edge of the access panel ring, upper and lower mounting brackets and the removable terminal strip bracket shall be so treated.

***NOTE:** all tapped holes shall be checked / re-worked post-galvanizing for compliance to the dimensions shown in the pole specification for the mounting screw thread sizes.

E42.5 Cover for the (38 Circuit) Wiring Access Panel: The (38 circuit) access panel shall be provided with a flanged, weatherproof non-metal cover.

NOTE: A non-metal access panel cover shall be supplied. *The galvanized access panel cover as detailed in Drawing No. ST-164, earlier revision is not to be supplied.*

- (a) The "non-metal" type access panel cover shall be strong, durable, resistant to impact damage by acts of vandalism, ultraviolet stabilized, tamper proof and not subject to breakage or deformation under temperatures ranging from -50° C to +50° C.
- (b) The intended function of the handhole cover is to:
- (i) Prevent access to the interior of the handhole when secured with the supplied hex head bolts.
 - (ii) Prevent/limit the ingress of water, snow, or items.
 - (iii) Withstand acts of vandalism caused by impact, or prying.
 - (iv) Provide a service lifetime similar to the pole.
- (c) Must maintain integrity of cover when bolts tightly fasten the handhole cover to the pole.
- (d) The access panel cover material shall be a homogenous colour throughout. The cover material colour shall be similar to the galvanized pole. Painted covers are not acceptable.
- (e) The access panel cover shall have a smooth and continuous circumferential perimeter flange. When mounted, the flange shall overlap the outside edge of the access panel ring sufficient to prevent driven snow or rain entry into the access panel, even at 25.6 psf design wind pressure. The flange shall be located no greater than 1/4" from the outside edge of the access panel ring. The flange depth shall be a minimum of 3/4" on the left and right sides (greater is preferred) and 7/16" on the top and bottom (greater is preferred). Flat covers will be rejected;
- (f) The cover shall have a smooth and continuous internally extruded ring. The ring shall be located between 1/8" and 1/4" from the inside of the clear opening of the pole's access panel ring. The width and depth of the internal ring extrusion shall be sufficient as to provide rigidity to the cover, to channel rogue moisture away from the terminal strip, and not interfere with the mounting of the access cover. The ring shall have a maximum 5/8" width and a maximum depth of 3/8" and not less than 1/4" depth.
- (g) Any additional extrusions into the pole access opening shall be limited to 3/8". Extrusions exterior to the plane of the access panel's opening shall be limited to 3/4" and shall be functional.

- (h) The cover shall bear down onto the access panel ring and lay flush against the entire perimeter of the access panel ring when the cover is attached;
- (i) The cover shall be fabricated of material with a minimum thickness of $\frac{1}{8}$ ".
- (j) All edges on the cover shall be smooth;
- (k) The cover shall be secured to the access panel by two $\frac{3}{8}$ inch diameter by 2 $\frac{1}{2}$ inches long, fully threaded hexagonal head Type 316 stainless steel bolts (hex head bolts, 9/16 inch across flats), each bolt complete with tamper proof cup washer (Drawing No. ST-164 R1). The tamper proof cup washer shall have an internal diameter of 13/16 inch.
- (l) The two holes in the cover for the mounting bolts shall be circular, $\frac{1}{2}$ inch diameter and centered over the upper and lower bracket mounting holes both vertically and horizontally to match the U-nuts;
- (m) A label identifying the manufacturer and year of manufacture shall be permanently formed or etched into the inside face of the access panel cover with a minimum 3/8" character height. The format is as follows:
 - (i) "XX – YR" - where "XX" shall be the abbreviation or logo of the Contractor's firm, followed by "dash", followed by the last two (2) digits of the year of manufacture
- (n) The Contractor shall install the access panel covers prior to final delivery;
- (o) Unless previously approved in E42.7, a sample of the proposed alternate cover shall be provided to the Contract Administrator for inspection prior to approval in accordance with B5.
- (p) No other logos or wordings shall be permitted on the exterior faces of the cover.

E42.6 Handhole Cover Impact Testing: The impact test represents a potential act of vandalism. The impact test involves dropping a pendulum consisting of a 10 lb weight, 6 foot arm, through a 90 degree arc to its lowest vertical resting point. The handhole cover will be cold soaked for 4 hours at - 30 degrees Celsius prior to testing. The 10 lb weight will move through the 6 foot radial arc and impact the centre of the handhole cover face which is affixed to the handhole opening on the signal pole using the supplied hex bolts (as illustrated in drawing S****). After being struck one time, the handhole cover will be examined for deformation or cracking. The sample will be found unacceptable if cracking appears, or deformation that affects the required functionality as per E42.5(b).

E42.7 Approved Access Panel Covers: The following "non-metal" products are approved provided they continue to meet all the specifications in section E12.4.

- (a) Valmont West Coast PVC Access Cover 2004 Drawing: 230 – CO - 5x25 – PVC
- (b) Patriot Sales Inc. Light Pole Access Cover Plate 2007 Drawing: PSI.09102007 Rev A
- (c) Power-Lite Industries– PWL-11, latest revision.

E43. MANUFACTURER'S IDENTIFICATION

E43.1 Each pole shall be marked in a clearly legible form to identify **the manufacturer, the production year and pole number**. Raised lettering shall be not less than 1 inch in height, confined to one flat and shall be raised not less than 1/16 inch in weld metal at the following prescribed location:

- (a) External face of pole within twenty-four inches (24") of the bottom of shaft.

E43.2 Format of the raised lettering markings shall be as follows:

- (a) "XX – YR - ###" - where "XX" shall be the abbreviation or logo of the Contractor's firm, followed by "dash", followed by the last 2 digits of the year of manufacture, followed by "dash" followed by ### which is the pole number starting with 001 and proceeding consecutively for each additional pole during the year of manufacture.
- (b) The Contractor shall ensure that poles manufactured under separate orders from the same contract continue to follow the unique consecutive numbering format.