MUNICIPALITY of the COUNTY of KINGS

Municipal EV Charging Stations

TENDER # 24-07

SPECIFICATION

ISSUED FOR TENDER

16 April 2024

Dillon Reference # 224817

Prepared with the assistance of:

DILLON CONSULTING

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Part 1 General

1.1 INVITATION

.1 Tender Submission:

.1 Bids may be submitted via electronic submission or in a hard copy, but must be received no later than 2:00:00 p.m. on **Tuesday, May 14, 2024**.

.2 Electronic submissions must be made through the Municipality of the County of Kings Portal (the "Municipal Web Portal") at https://www.countyofkings.ca/business/Tenders-RFPs. A one-time registration to create an account may be required.

.3 Hard-copy Bids must be submitted in a vendor identified envelope as detailed below:

ATTN: Kristy Taylor, Procurement Officer
Tender No. 24-07 – Municipal EV Charging Stations
Addressed to:
Municipality of the County of Kings
181 Coldbrook Village Park Drive,
Coldbrook, Nova Scotia
B4R 1B9

.2 Tenders received after the Submission Deadline shall not be opened and will be destroyed.

.3 Tender opening and evaluation will be performed by identified members of Municipal staff and management and may involve 3rd party consultants. Opening will not be public.

.4 All blank spaces on Bid Form and Supplements to Bid Form should be completed. Owner may, in its sole and absolute discretion, declare a bid non-compliant where there is incomplete or missing information.

.5 The Owner reserves the right to reject any or all tenders or accept any tender deemed satisfactory.

1.2 INTENT

.1 The intent of this Bid Call is to provide electric vehicle charging stations at multiple site locations in the Municipality of the County of Kings as described in the plans and specifications.

1.3 BID/CONTRACT DOCUMENTS

.1 DEFINITIONS:

.1 Contract Documents: Defined as CCDC 2 - 2020 (supplemented by Section 00 73 00 Supplementary Conditions), and Specifications and Drawings as prepared by the Consultant, Dillon Consulting Limited, and listed in the List of Contents.

.2 AVAILABILITY OF CONTRACT DOCUMENTS

.1 Hard copies of the Tender document and drawings are available upon request for a non-refundable fee of $50. Fee must be paid upon collection of documents at Municipal office located at 181 Coldbrook Village Park Drive, Coldbrook, Nova Scotia.

.2 The Bid Documents are made available to Bidders only for the purpose of obtaining Bids for this project. The Bid Documents are, and shall remain, the property of the Owner and may not be used by a Bidder for any purposes other than preparation of its Bid and completion of the Work should the Bid be successful. Their use does not confer a license or grant for other purposes.

.3 EXAMINATION:

.1 Upon receipt of Bid Documents, verify that documents are complete.

.2 Immediately notify Owner upon finding discrepancies or omissions in Bid Documents.

.3 Non-mandatory site visits of the locations of the Work will be provided to the Bidders upon request. It is the responsibility of the Bidders to request and schedule site visits with the Owner.

.4 INFORMATION ONLY:

.1 Refer to Section 01 71 00 Examination and Preparation, for Information Provided by the Owner, provided as 'Information Only' for work not by this contract, but affecting the work of this contract.

.5 QUERIES/ADDENDA:

.1 All inquiries must be submitted by email in clear written form to the attention of:

.1 Kristy Taylor, Procurement Officer, ktaylor@countyofkings.ca

.2 All queries/questions must be submitted by email.

.3 Verbal answers are only binding when confirmed by written addenda.

.4 Clarifications requested by Bidders must be in writing not less than seven (7) days before date set for receipt of Bids. Reply will be in form of an addendum. Addenda will be posted to the Municipal Web Portal and the Nova Scotia Procurement Portal (https://procurement-portal.novascotia.ca/tenders). It is the responsibility of the Bidder to ensure they have received all released addenda and Bidders shall acknowledge their receipt in their Bid submission.

.5 Addenda may be issued during bidding period. All addenda become part of Contract Documents.

.6 No addendum will be issued later than three (3) days prior to the close of Tenders except a Bulletin if necessary, postponing the date for receipt of Tenders.

.7 It is the responsibility of each Bidder to ascertain prior to submitting his Tender that he has received all Addenda issued and shall acknowledge their receipt in his Tender.

.8 Receipt of Addenda must be acknowledged on Tender Form.

.9 It is the responsibility of General Contractors to supply, in writing, correct contact information, including email address to the contact for inquiries, in the event future documents and/or addenda may be issued.

1.4 SUBMISSION

.1 Bid Ineligibility:

.1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind shall, at discretion of Owner, be declared informal.

.2 Bids with Bid Forms and enclosures which are improperly prepared shall, at discretion of Owner, be declared informal.

.3 Bids that fail to include security deposit, bonding or insurance requirements shall, at discretion of Owner, be declared informal.

.2 Submissions:

.1 Bidders shall be solely responsible for submission of their Bids in manner and time prescribed.

.2 Submit one copy of executed offer on Bid Forms provided, signed and with corporate seal together with required Consent of Surety in a sealed opaque envelope clearly identified with Bidder's name, project name and Owner's name on outside, or via electronic submission.

1.5 BID ENCLOSURES/REQUIREMENTS

.1 Consent of Surety:

.1 Not required.

.2 Security for Contract:

.1 Within ten (10) days after notification of Award of the Contract, the Contractor shall provide the Owner with Contract Security in the various forms as outlined herein.

.2 The Contractor shall provide the Owner with a Performance Bond and a Labour and Material Payment Bond acceptable to the Owner, each in an amount equal to Fifty Percent (50%) of the amount of the Contract. Certified cheque payable to the Owner in the amount of 50% of the Tendered Price would be an acceptable alternative.

.3 The Bonds shall be maintained in force for a period of not less than twelve (12) months after issuance of the Total Performance Certificate.

.4 Contract Security shall be provided at the expense of the Contractor. The bonds shall be issued by an established Surety Company satisfactory to, and approved by, the Owner. Contract security, other than bonds, will be used by the Owner in the same manner as a Performance Bond and the Labour and Material Bond.

.5 Include cost of bonds in Bid Price.

.3 Insurance:

.1 As required by CCDC 2 - 2020, GC 11.1. Insurance.

.4 Bid Form Requirements:

.1 Substantial Performance date of this Work will be as noted in the Bid Tender Form Part 1.

.2 Contractor to be aware that the Owner will strictly enforce the Contract Closeout Procedures and Closeout Submittals in General Requirements. Substantial Performance will not be granted until all procedures and submittals are completed as noted.

.5 Special Prices:

.1 Alternative Prices will be considered in Award of Tender. See Section 00 41 00 Bid Tender Form Appendix A - Alternative Prices.

1.6 PERMITS

.1 The contractor will apply and pay for permits necessary to complete the Work, with the exception of the Building Permit, which will be paid for by the Owner.

1.7 SIGNING

.1 The Bid shall be signed under seal by the Bidder.

.2 Sole Proprietorship: Signature of sole proprietor is the presence of a witness who will also sign. Insert the words "Sole Proprietor" under signature. Affix seal.

.3 Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" against each signature. Affix seal against each signature.

.4 Limited Company: Signature of duly authorized signing officers in their normal signatures. Insert the officer's capacity in which the signing officer acts against each signature. Affix the Corporate Seal. If the Bid is signed by officials other than the President and Secretary of the company or the President/Secretary-Treasurer of the company, a copy of the Bylaw Resolution of the Boards of Directors authorizing them to do so must also be submitted with the Bid in the Bid envelope.

.5 If the Bidder is a joint venture, each part to the joint venture shall execute the Bid under seal in the manner appropriate to such party.

1.8 BIDDER'S REPRESENTATION

.1 Each Bidder in submitting their Tender represents that:

.1 The Bidder has read and understands the Contract Documents and bid is made in accordance therewith.

.2 The Bidder has visited the site and has familiarized themselves with all conditions thereon and has taken into consideration, all such conditions that may affect the work.

.3 Bid is based upon the materials, systems and plant described in the Contract Documents without exception.

.4 Bid is open to acceptance and shall be irrevocable for a period of sixty (60) days after the Bid Closing date.

1.9 APPROVED ALTERNATES DURING BIDDING

.1 Should the Contractor desire to provide an alternate material for one or more specified by name, they shall apply in writing for such permission at least seven days before closing date of Tender. Items submitted after this date will not be considered. Bidder must provide prints/photocopies/brochures of drawings, diagrams, illustrations, schedules,

performance charts or other data necessary to illustrate details of proposed substitution. All substituted items must be clearly indicated. Notification of approval of same will be distributed by Addendum.

1.10 AWARD OF TENDER

.1 The Owner reserves the right to review all subcontractors proposed for this project by the General Contractor.

.2 All Bids shall undergo review and scoring. The highest scoring Bid will be recommended to Municipal Council for award.

.3 Bids shall be evaluated and scored by the Owner in accordance with the following matrix:

.1 Completion Date – Maximum points to be awarded: 25

.2 Bidder references – Maximum points to be awarded: 25

.3 Bid Price score (factoring Alternative Pricing, where applicable) – Maximum points to be awarded: 50

.4 The Bid Price with the lowest cost will receive 50 points, and all other proposals will be ranked on a linear relationship such that a Bid at twice the cost would receive half the points. Bid Price will include Alternative Pricing, where provided and accepted.

.4 The Bidder acknowledges that it shall have no claim against, or entitlement to damages from, the owner by reason of the owner's rejection of its bid or of all bids.

.5 Tenders submitted by Bidders that indicate "own forces" for subcontract work which, in the opinion of the Owner cannot be successfully completed by the Contractor's employees, will not be accepted.

.6 After acceptance by Owner, a written Bid Acceptance will be forwarded to the successful Bidder.

.7 The successful Bidder will execute the Form of Agreement between the Contractor and Owner as per CCDC 2 - 2020 Standard Contract.

1.11 FEES FOR CHANGES IN THE WORK

.1 For authorized changes to the Contract work resulting in a credit, or credit to the Owner shall be the actual cost of the work without any additional charges for overhead, profit and supervision.

.2 By cost and percentage being set out as follows:

.1 Sub-contractors overhead and fees shall be calculated on additional work only after all credits included in the changes have been deducted. Such percentages shall not exceed 5% of costs for overhead and profit.

.2 General Contractors percentage for overhead and fees shall not exceed 5% of Sub-Contractors total charges.

.3 Where the General Contractor carries out the changes with his own forces, exclusive of Sub-Contractors, his overhead and fee charge shall not exceed 10% of costs.

END OF SECTION

TENDER SUBMITTED BY:

Firm Name _____

Address _____

Contact Person _____

Part 1 General

1.1 TENDER PRICES

.1 We, the undersigned, having carefully examined the sites where the work is to be performed, having become familiar with the local conditions, the character and extent of the work, and having carefully examined the Instruction to Bidders, Forms of Agreement, General Conditions, Specifications and Drawings, as applicable, hereby offer to enter into a Contract required to perform the Work as described in the Instructions to Bidders, required by the above mentioned documents for a stipulated price contract:

_____ dollars

in Canadian Funds which price excludes the HST.

The Tender Price includes all applicable duties, permits (other than the building permit).

1.2 ADDENDA

.1 The undersigned hereby acknowledges that the following Addenda have been received and included for in this Tender.

Addendum No. Dated_____

Addendum No. Dated_____

Addendum No. Dated_____

1.3 SUBSTANTIAL PERFORMANCE

.1 We hereby agree to start work immediately upon notification of award and to complete the Work by the following date: _____

.2 We understand that portions of the work may be required to take place outside normal working hours to suit the operational schedule of the Owner.

1.4 DECLARATIONS

.1 The undersigned hereby declares and agrees:

.1 We are in good standing with the Worker's Compensation Board for the Province of Nova Scotia and must present to the Owner a current Certificate of Contractors

Registration with Workers Compensation Board of Nova Scotia as applicable to the Contractor and Subcontractor.

.2 No person, firm or corporation other than the under-signed has any interest in this Tender or in the proposed Contract for which this Tender is made.

.3 This Tender is open to acceptance for a period of sixty (60) days from the date of Tender closing.

.4 To provide to the Owner, within two weeks after notification of the award, a Performance Bond and a Labour and Material Payment Bond each in the amount of fifty percent (50%) of the total contract price, and/or certified cheque in the amount of 10% of overall price.

.5 To take out and maintain all necessary insurance as outlined in Supplementary Conditions Section 00 73 00 and provide one (1) copy of all insurance policies to the Owner within two weeks after notification of acceptance.

.6 That unless and until a formal agreement is prepared and executed, this Tender together with the Owner's acceptance thereof shall constitute a binding contract with the Owner.

.7 To mobilize and start Work on the project immediately upon notice of written acceptance.

.8 To provide within seven (7) days after notification of acceptance five (5) copies of a completed Construction Schedule. The Construction Schedule shall indicate the starting date, construction period, completion date and dependencies between all parts of the Work.

.9 Part 2 of the Bid Form Section 00 41 00 properly completed will be submitted within 24 hours of the closing date for Part 1 of the Bid Form.

.10 To submit with the Bid Form, a copy of the Bidder's current and valid Certificate of Recognition issued jointly by the Provincial Construction Safety Association and the Provincial Department of Labour.

.11 Prior to final payment by the Owner, the contractor shall submit to the Owner a statutory declaration and items referenced in Division 01, Closeout Procedures.

.12 That all contractors and subcontractors must provide Revenue Canada business numbers.

.13 To submit Curriculum Vitae for the Project Manager and Site Superintendent they will assign to the Project.

1.5 SIGNATURES, SEAL

.1 Signed, sealed and submitted for and on behalf of:

Name of Company: _____

Address of Company: _____

Authorized Signature: _____

Name & Title: _____ (Printed or Typed)

Witness: _____

Date (Y/M/D): _____

HST Registration #: _____

If Bidder is a Corporation, the Corporate Seal shall be affixed

1.6 ACCEPTANCE

.1 We hereby accept the above Tender for the bid price, as shown, on this day of [insert date], as witnessed below.

Owner: _____

Name & Title: _____

Witness: _____

Name & Title: _____

END OF BID TENDER FORM - PART 1

(TO BE SUBMITTED TO THE OWNER WITHIN 24 HOURS OF BID CLOSING.)

Firm Name _____

Address _____

Contact Person _____

The undersigned hereby offers information supplemental to Section 00 41 00, Bid Form-Part 1, as follows. The cost information is for the confidential use of the Owner.

For items of work where CSA Certification is required, parties named will possess CSA Certification at time of work performance.

Should Bidder be awarded the contract, parties named, including Bidder's own forces, shall be used to perform the work they are scheduled to perform and shall not be changed without written consent from the Owner.

1.1 DECLARATIONS

The undersigned hereby declares and agrees to the following:

.1 The pricing information quoted above will hold for a period of 60 days from the date of submission of Document 00 41 00, Bid Form-Part 1.

.2 Pricing information quoted above includes any applicable information indicated in Addenda received and listed on Document 00 41 00, Bid Form-Part 1.

1.2 SPECIAL PRICES

.1 Refer to Appendix 'A' - Alternative Prices.

.2 Refer to Appendix 'B' – Itemized Prices.

1.3 SIGNATURES

Signed by: _____

(print name of signing officer)

_____

(signature of signing officer)

Date (Y/M/D): _____

Witnessed by: _____

(print name of witness)

_____

(signature of witness)

END OF BID TENDER FORM - PART 2

Attachment: Appendix 'A' - Alternative Prices

Attachment: Appendix 'B' – Itemized Prices

Appendix "A" - Alternative Prices

FROM: _____

(name of tendering company)

We, the above-named Bidder, offer below the requested alternative prices. The amount to be deducted from our base bid price (as entered in the Bid Form) is entered for each requested alternative. All alternative prices exclude Value Added Taxes. If there is no change to the base bid price for an alternative, we have so indicated. It is understood that:

.1 the Owner may accept any of the alternatives and corresponding alternative prices in any order or combination, including all or none,

.2 alternative pricing shall be reviewed by the Owner and approved at the Owner's sole discretion. After review and approval, alternative pricing shall be incorporated to form a revised total which will be used in the overall evaluation and scoring of the Bid.

.3 alternatives and alternative prices are open for acceptance by the Owner for the same period of time as the base bid price,

.4 the Work of the Contract and the Contract Price will reflect the alternatives and alternative prices, if any, accepted by the Owner at the time of contract award, and

.5 acceptance of any alternatives will not affect the contract completion time, unless we have specifically indicated an increase or decrease in time, in number of days, on account of a particular alternative.

ALTERNATIVE PRICE #1:

Provide an Alternative Price which entirely removes the requirement of concrete work at Greenwood STP, 989 Meadowvale Road.

Deduct $ _____

END OF APPENDIX 'A'

Appendix "B"- Itemized Prices

FROM: _____

(name of tendering company)

We, the above-named Bidder, provide below the requested breakdown of items of Work included in our bid price (as entered in the Stipulated Price Bid Form). It is understood that these itemized prices are provided for information purposes only and will not be used to modify the scope of the Work and adjust our bid price.

ITEM OF WORK		ITEMIZED PRICE
.1	ALL WORK AT MUNICIPAL MAIN BUILDING, 181 COLDBROOK VILLAGE DRIVE	$ _____
.2	ALL WORK AT MUNICIPAL OPERATIONS BUILDING, 67 COLDBROOK VILLAGE DRIVE	$ _____
.3	ALL WORK AT HANTS BORDER SEWAGE TREATMENT PLANT, 208 AVON STREET, HANTSPORT	$ _____
.4	ALL WORK AT GREENWOOD SEWAGE TREATMENT PLANT, 989 MEADOWVALE ROAD	$ _____
.5	ALL WORK AT WATERVILLE SEWAGE TREATMENT PLANT, 1307 COUNTY HOME ROAD, KINGS COUNTY	$ _____
.6	ALL WORK AT ALDERSHOT SEWAGE TREATMENT PLANT, 00 NS-341 (HIGHWAY 341), UPPER DYKE	$ _____

END OF APPENDIX 'B'

Appendix "C"- References

FROM: _____

(name of tendering company)

We, the above-named Bidder, provide below the requested references to be used for review and scoring purposes. A minimum of three (3) references have been provided which pertain to previous projects that are similar in scope. These references will be contacted and scored by the Owner. We understand that the reference scores will be combined as identified in Section 00 21 13 and used to determine Tender award.

Contact Name	Contact Organization	Contact Email	Contact Phone	Project Details

END OF APPENDIX 'C'

THIS FORM IS TO BE SUBMITTED WITH THE BID/TENDER FORMS.

.1 In submitting this Tender we recognize the necessity to complete the information requested in any Section or appendices as well as the right of the Owner to accept any Tender at the price submitted or to reject all Tenders, it being understood and this Tender is submitted on the express condition that revised Tenders will not be called for if minor changes are made.

.2 In the event of this Tender being accepted within sixty (60) days of the time stated for the closing of Tenders, and our failing or declining to enter into a contract, then our bid bond shall be forfeited to the Owner in lieu of any damages which he may suffer by reason of our failure or refusal to enter into such Contract.

.3 In the event of our tender not being accepted within sixty (60) days of the time stated for the closing of Tenders, the bid bond, if requested, will be returned to us forthwith unless a satisfactory arrangement is made with us covering its retention for a further stated period.

.4 The undersigned Bidder declares that this Tender is made without connection with any other person or persons submitting Tenders for the same work and is in all respects fair and without collusion or fraud.

PROJECT: _____

SUBMITTED BY: _____

SIGNATURE: _____

DATE: _____

END OF SECTION

1.1 Agreement between Contractor and Owner for Construction

.1 Agreement between Owner and Contractor shall be CCDC 2 - 2020 Standard Stipulated Price Contract

1.2 Form of Guaranty

.1 Guaranty/Warranty for all work done under this Contract shall be for a period of one (1) year from date of Substantial Performance unless requiring extended warranties as indicated.

The Sub Contractor shall and hereby does warrant General Contractor shall and hereby does guarantee all work carried out by them to be free from defects of material and workmanship for a period of one (1) year (unless noted otherwise on drawings) from the date of Substantial Performance of this work. The above parties further agree that they will, at their own expense, repair and replace all such defective work and all other work damaged thereby, which becomes defective during the term of the Guaranty-Warranty.

.2 In case of work performed by Sub Contractors and where guarantees are required, secure warranties from said Sub Contractors addressed to and in favour of the Owner; deliver copies of same to the Owner upon completion of work.

.3 Delivery of said guarantees shall not relieve the Contractor from any obligation assumed under any other provisions of the Contract.

.4 Should any defects develop in aforesaid Work, within specified periods, due to faults in materials and/or workmanship, the Contractor shall make repair or do necessary Work to correct defective Work as approved. Execute such repairs, corrective Work, including cost of making good other Work damaged by or otherwise affected by making repairs or corrective Work without extra costs to the Owner, at entire cost to Contractor, within five days after written notice to Contractor by Owner.

.5 In case Contractor fails to do Work so ordered, Owner may have Work done, charge cost thereof against monies retained as provided for in Agreement, if said retained monies are insufficient to pay such cost, or if no money is available, Contractor and his Sureties agree to pay Owner cost of such Work.

.6 Nothing herein intends or implies that Guaranty shall apply to Work which has been abused or neglected by Owner or his successor in interest.

1.3 TIME

.1 The Contract Time is the time stipulated in the Contract Documents for Substantial Performance of the Work.

.2 The date of Substantial Performance of the Work is the date certified as such by the Contract Documents.

.1 Day means the calendar day.

.2 Working day means days other than Saturdays, Sundays and holidays which are observed by the construction industry in the area of the place of the work.

1.4 SUBSTANTIAL PERFORMANCE

.1 Substantial Performance: is as defined in the lien legislation applicable to the place of the work. If such legislation is not in force or does not contain such definition, Substantial Performance of the Work shall have been reached when the work is ready for use or is being used for the purpose intended and is so certified by the owner.

END OF SECTION

Part 1 General

1.1 STANDARD FORM

.1 The General Conditions of the Contract, CCDC 2 - 2020 Standard Stipulated Price Contract, Agreement between the Owner and the Contractor is hereby made part of this specification to the same intent as it is found herein.

1.2 WORKERS' COMPENSATION

.1 Comply with the provisions of the Workers' Compensation Act and supply the Owner with certificate of good standing at commencement of the Contract, before final payment is made and at such other times as may be required.

1.3 VACATION WITH PAY

.1 Comply with the provisions of the Vacation With Pay Act.

1.4 UNEMPLOYMENT INSURANCE

.1 Comply with the regulations of the Unemployment Insurance Commission of Canada.

END OF SECTION

1.1 MODIFICATIONS TO GENERAL CONDITIONS

.1 Definitions

.1 The word "Architect" or "Consultant" where used in these instructions means the firm of Dillon Consulting Limited, 7071 Bayers Road, Suite 2001, Halifax, Nova Scotia, B3L 2C2

.2 The word "Owner" shall mean the Municipality of the County of Kings.

.3 The word "Contractor" where used in these instructions means the party or parties to whom the Owner may award the Contract.

1.2 GC 1.1 CONTRACT DOCUMENT

.1 Add 1.1.12: The Drawings and Specifications are to be considered complementary and any Work shown on the Drawings but not described in the Specifications, or vice versa, or any work obviously necessary to complete the Work within the limits of the Drawings and Specifications is to be considered as the balance of the Work. Any discrepancies between the drawings and specifications, not brought to the Architect's attention during bidding phase, will then be clarified by the Owner, or his representative.

1.3 GC 3.5.3 ADDITIONAL INSTRUCTIONS

.1 The following is added as 3.5.3: Instructions shall be deemed to have been duly given if delivered in writing to the individual who the successful Bidder places in charge of this project or to an office of the Corporation for whom it is intended, or if delivered at or sent by mail or fax to the last business address known to him who gives notice.

1.4 GC 6 Changes in the Work

.1 Add to 6.2.2: Change Orders shall be documented on "Change Order" forms and shall carry a numerical reference. The Contractor shall, submit his quotation on the work involved for approval prior to implementing the change. From time to time the approved amounts pertaining to the work described on various Change Order forms will be summarized on an official "Change Order to Contract" form issued and signed by the Owner and requiring acknowledging signature by the Contractor. Where the net increase in any "Change Order to Contract" exceeds five percent (5%) of the original Contract Price, the Contractor shall obtain the signature of the Surety on the Change Order, or the acknowledgement of the Surety in letter form, but the failure to do so in any instance shall not release the Surety from any obligations on his Bond. Unless the Surety gives express written notice to the Owner at the time of the execution of the Performance Bond, the consent of the Surety to all changes provided under the Contract shall be presumed, whether the Surety signs the individual Change Order or not.

1.5 GC 6.5 Delays

.1 Reasonable Time is defined as seven (7) days unless otherwise defined.

1.6 GC 10.1 Taxes and Duties

.1 10.1.1 Change: The contractor shall exclude all Harmonized Sales Tax. Contractor shall pay any customs duties

1.7 GC 11.1 Insurance

.1 Comprehensive General Liability and Property Insurance complying in all respects with the provisions of Insurance clauses shall be provided and maintained by the Contractor.

END OF SECTION

Part 1 General

1.1 SUMMARY OF WORK

.1 Description of Work.

.2 Contractor use of Premises.

.3 Contract Method.

.4 Site Security.

1.2 DESCRIPTION OF WORK

.1 Wherever in the Contract Documents the word “provide” is used in any form, it shall mean that the Work concerned is to include both supply and installation of the products required for completion of that part of the Work.

.2 This contract includes full structural and electrical disciplines to provide electric vehicle charging stations at multiple site locations in the Municipality of the County of Kings as described in the plans and specifications. Refer to Section 34 71 13.31, 1.2 for summary of scope of work by site locations.

1.3 CONTRACTOR'S USE OF PREMISES

.1 Except as otherwise specified, Contractor has unrestricted use of the Place of the Work from time of Contract award until Substantial Performance of the Work.

.2 Confine Construction Equipment, Temporary Work, storage of Products, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and the Contract Documents, whichever is most restrictive. Do not unreasonably encumber the Place of the Work.

1.4 CONTRACT METHOD

.1 Construct the Work under the following Contract Method:

.1 CCDC 2 - Stipulated Price Contract.

1.5 SITE SECURITY

.1 General Contractor’s Responsibilities:

.1 The Contractor to assume total responsibility for security of the construction area described in this contract for all construction materials and components that are supplied by this contract or owner supplied.

.2 The contractor is responsible for the safety of the site during the construction period to Substantial Performance.

.3 Maintain security of construction area by control of access through enclosing fences, barricades, and hoardings during time Work is in progress, and by locking hardware otherwise.

.4 Maintain its security by adequate barriers to entry, and by temporary doors equipped with locking hardware.

.5 Provide sufficient temporary illumination of site so that security can be maintained.

END OF SECTION

Part 1 General

1.1 RESTRICTIONS ON USE OF PREMISES

.1 Limit use of premises for Work, for storage, and for access, to allow;

- .1 Owner occupancy.
- .2 Partial owner occupancy.
- .3 Work by other contractors.
- .4 Public usage.

.2 Coordinate use of premises under direction of Owner.

1.2 WORK SEQUENCE

.1 Schedule and construct Work in stages to accommodate Owner's use of premises during construction.

.2 Schedule and construct Work in stages to provide for continuous public usage. Do not close off usage of facilities until use of one stage of Work will provide alternate usage.

1.3 RESTRICTED HOURS OF WORK

.1 Coordinate Work to be performed within the hours as noted by the municipality noise by-laws.

.2 Schedule Work during Owner’s regular hours of work, 7:30 a.m. – 4:30 p.m. local time, Monday to Friday, unless otherwise noted or coordinated with the Owner.

.3 Allow for hours of work restrictions in construction progress schedule.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 Use Application for Payment based on the Schedule of Values (follows this section) for Contractor's Progress Claim.

.1 Make applications for payment monthly on account on Application for Payment Form provided at start-up meeting.

.2 Application for Payment shall be completed in accordance with the requirements of the Agreement and General Conditions of the Contract.

.3 Submit to Owner, at least 14 days before first application for payment, Schedule of Values for parts of Work, aggregating total amount of Contract Price, to allow applications for payment.

1.2 SCHEDULE OF VALUES

.1 Prior to the first application for payment, submit for the Owner's review an initial schedule of values. Modify the initial schedule of values if and as requested by the Owner. Obtain the Owner's written acceptance of the initial schedule of values prior to the first application for payment.

.2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and Products delivered to the Place of the Work.

.3 Provide the schedule of values in an electronic spreadsheet format based on the format provided and content described in latest edition of CCDC 24 – A Guide to Model Forms and Support Documents.

.4 A work breakdown structure that is sufficiently detailed and comprehensive to facilitate the Owner's evaluation of applications for payment at an appropriate level of detail.

.5 Provisions for approved Change Orders so that the breakdown amounts indicated in the schedule of values aggregate to the current total Contract Price. Indicate Change Directives separately.

.6 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:

.1 Breakdown Amount: A dollar amount, including an appropriate pro rata portion of the Contactor's overhead and profit.

.2 Performed to Date: The value of Work performed and Products delivered to the Place of the Work up to the date of the application for payment, stated as a percentage of the Contract Price and in dollars.

.3 Previously Performed: The value of Work performed and Products delivered to the Place of the Work for which payment has been previously certified, stated in dollars.

.4 Current Period: The value of Work performed and Products delivered to the Place of the Work for which the Contractor is currently applying for payment, stated in dollars.

.5 Balance to Complete: The value of Work not yet performed and Products not yet delivered to the Place of the Work, stated in dollars.

1.3 CASH FLOW PROJECTION

.1 Prior to the first application for payment submit, for the Owner's review, a forecast of approximate monthly progress payments for each month of the Contract Time.

.2 Submit revised cash flow forecasts when required due to significant changes in rate of progress of the Work or significant changes in the Contract Price or when requested by the Owner.

1.4 WORKERS' COMPENSATION CLEARANCE

.1 Submit proof of workers' compensation clearance with each application for payment.

1.5 STATUTORY DECLARATIONS

.1 Submit a statutory declaration in the form of CCDC 9A – Statutory Declaration of Progress Payment Distribution by Contractor with each application for payment except the first.

1.6 RELEASE OF HOLDBACK

.1 Refer to Section 01 77 00 Closeout Procedures.

1.7 FORM OF SUBMITTAL

.1 A sample of the Schedule of Values Form required is attached at the end of this section.

.1 Itemized separate line item cost for work required.

.2 Submit separate Schedule of Values of the Project having clearly defined stages or phases.

.3 The sum of all values listed in the schedule shall equal the total Contact Price.

.4 The Schedule of Values is the price breakdown per line item of work and not the contract value for each Subcontractor engaged in the project. Refer to Section 01 77 00 Closeout Procedures to determine the complete value of the Subcontractors contract and their holdback to meet the requirements of the 2017 Builder's Lien Act.

.2 Include completed Statutory Declaration with monthly Application for Payment.

.3 Statutory Declaration are in the Form of CCDC 9A.

END OF SECTION

Schedule of Values

Client Name: Municipality of the County of Kings
Project Name: Municipal EV Charging Stations
Project Number: #24-07
Contractor Name:
Consultant Name:

Application for Payment #:
Issue Date:
for Period Ending:

Specification Section	Item	Contract Amount	Completed to Date (%)	Previous Amount ($)	Amount This Draw ($)	Completed to Date ($)	Balance to Complete ($)
General	Insurance						
	Bonding						
	Mobilization						
	Supervision						
	etc.						
260500	Materials: 181 COLDBROOK VILLAGE DRIVE						
	Labour: 181 COLDBROOK VILLAGE DRIVE						
	etc.						
	Materials: 67 COLDBROOK VILLAGE DRIVE						
	Labour: 67 COLDBROOK VILLAGE DRIVE						
	etc.						
	Materials: 208 AVON STREET, HANTSPORT						
	Labour: 208 AVON STREET, HANTSPORT						
	etc.						
	Materials: 989 MEADOWVALE ROAD						
	Labour: 989 MEADOWVALE ROAD						
	etc.						
	Materials: 1307 COUNTY HOME ROAD, KINGS COUNTY						
	Labour: 1307 COUNTY HOME ROAD, KINGS COUNTY						
	etc.						
	Materials: 00 NS-341 (HIGHWAY 341), UPPER DYKE						
	Labour: 00 NS-341 (HIGHWAY 341), UPPER DYKE						
	etc.						
Total							
Issued Change Orders:							
1							
etc.							
Total							

Part 1 General

1.1 CONSTRUCTION ORGANIZATION AND START-UP MEETING

.1 Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of the Owner, Consultant, Contractor, major Subcontractors and field inspectors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.

.4 Agenda to include following:

- .1 Appointment of official representative of participants in Work.
- .2 Schedule of Work, progress scheduling in accordance with Division 01 Construction Progress Documentation.
- .3 Schedule of submission of shop drawings, samples, colour chips in accordance with Submittal Procedures.
- .4 Establish at the beginning any long-term delivery items, Structural or Electrical etc. that may impact the construction schedule.
- .5 Requirements for temporary facilities, site sign, offices, storage sheds, utilities and fences in accordance with Temporary Utilities.
- .6 Delivery schedule of specified equipment in accordance with Construction Progress Documentation.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
- .8 Owner provided Products and / or equipment.
- .9 Record drawings in accordance with Contract Closeout Procedures.
- .10 Maintenance manuals in accordance with Contract Closeout Submittals.
- .11 Take-over procedures, acceptance, and warranties in accordance with Contract Closeout Procedures.
- .12 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .13 Appointment of inspection and testing agencies or firms in accordance with Quality Control.
- .14 Insurances and transcript of policies.
- .15 Safety and Security.

1.2 CONSTRUCTION PROGRESS MEETINGS

.1 Schedule and administer regular meetings throughout progress of Work, frequency of the meetings will be established by the Owner's Project Manager.

.2 Contractor and major Subcontractors involved in Work and the Consultant and Owner's representatives are to be in attendance.

.3 Prepare agenda for meetings.

.4 Distribute written notice of each meeting five (5) days in advance of meeting date to the Consultant and Owner.

.5 Make arrangements for meetings. Coordinate with Owner's Project Manager.

.6 Agenda to include following:

- .1 Review, approval of minutes of previous meeting.
- .2 Review of Work progress since previous meeting.
- .3 Field observations, problems, conflicts.
- .4 Waste Management Plan
- .5 Indoor Air Quality Plan during Construction
- .6 Review of RFIs; addressed adequately and with adequate response time. Review of Change Orders.
- .7 Problems which impede construction schedule, and any anticipated changes.
- .8 Review of off-site fabrication delivery schedules.
- .9 Corrective measures and procedures to regain projected schedule.
- .10 Revision to construction schedule.
- .11 Regular on-site progress review meetings with consultant group.
- .12 Progress schedule, during succeeding work period.
- .13 Review submittal schedules: expedite as required.
- .14 Maintenance of quality standards.
- .15 Review proposed changes for effect on construction schedule and on completion date.
- .16 Anticipated long delivery items
- .17 Coordination meeting Mechanical and Electrical.
- .18 Safety and Security.
- .19 Other business.

.7 Record minutes. Include significant proceedings and decisions. Identify action by parties. Distribute by hard copy and electronic email to meeting participants, affected parties not in attendance and Owner's representatives, within 48 hours of meeting. Include in minutes all action items for response prior to next meeting and identify those responsible for required actions.

END OF SECTION

Part 1 General

1.1 SCHEDULES REQUIRED

.1 Submit schedules as follows:

- .1 Construction Progress Schedule.
- .2 Submittal Schedule for Shop Drawings and Product Data.
- .3 Submittal Schedule for Samples.
- .4 Product Delivery Schedule highlighting any long term delivery items.
- .5 Schedule for interference coordination.
- .6 Shutdown or closure activity.
- .7 Commissioning Schedule.

1.2 CRITICAL PATH SCHEDULE FORMAT

.1 Prepare critical path schedules in form of a horizontal bar chart, using MS Project, or equivalent.

.2 Provide a separate bar for each major item of work or operation.

.3 Split horizontally for projected and actual performance.

.4 Provide horizontal time scale identifying last work day of each week.

.5 Format for listings: chronological order of start of each item of work.

.6 Identification of listings: By Specification subjects.

1.3 SUBMISSION

- .1 Submit initial format of schedules within five (5) working days after award of Contract.
- .2 Submit schedules in electronic format, forward through e-mail as pdf files.
- .3 Consultant will review schedules and return review copy within five (5) days after receipt.
- .4 Re-submit finalized schedule within five (5) days after return of review copy.
- .5 Submit revised progress schedule with each application for payment.
- .6 Distribute copies of revised schedule to:
  - .1 Job site office.
  - .2 Subcontractors.
  - .3 Other concerned parties.
  - .4 On site inspector-Architects' Representative.
- .7 Instruct recipients to report to Contractor within five (5) days, any problems anticipated by timetable shown in schedule.
- .8 Show changes occurring since previous submission of schedule:
  - .1 Major changes in scope.

.2 Activities modified since previous submission.

.3 Revised projections of progress and completion.

.4 Other identifiable changes.

.9 Provide a narrative report to define:

.1 Problem areas, anticipated delays, and impact on schedule.

.2 Corrective action recommended and its effect.

.3 Effect of changes on schedules of other contractors.

1.4 DIGITAL PROGRESS PHOTOGRAPHS

.1 Digital Image Size: Minimum 1024 pixels x 728 pixels x 72 dpi.

.2 Digital Image Format: JPG Image with high image quality.

.3 Identification: Date of exposure indicated on bottom right hand corner of image.

.4 Email images to: (Distribution to the Owner, the Consultant, and others, to be determined at the Pre-Construction Meeting.).

1.5 SUBMITTALS SCHEDULE

.1 Include schedule for submitting shop drawings, product data, samples.

.2 Indicate dates for submitting, review time, resubmission time, last date for meeting fabrication schedule.

.3 Include dates when delivery will be required for any Owner-furnished products.

.4 Include dates when reviewed submittals will be required from Consultant.

1.6 INTERFERENCE COORDINATION

.1 Prior to commencing work, ensure coordination has been thoroughly documented for all structural, mechanical, and electrical contractors.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Make submittals specified in this section to the Owner unless otherwise specified, with additional submissions made, in a manner directed by the Owner to other parties involved with construction of the Project as their interests are concerned. These parties are, but shall not be restricted to, Owner, Consultants, jurisdictional authorities, and Subcontractors whose Work must be coordinated with Work related to submittals. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in metric units.

.4 Review submittals prior to submission to Owner. The Contractors review represents that necessary requirements have been determined and verified, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and will be considered rejected.

.5 All sample and shop drawing submissions to be accompanied with an executed "Sample and Shop Drawing Submittal Form" included at the end of this section. Submittals received without this form will be returned without being reviewed and will be considered rejected.

.6 Notify Owner, in writing at time of submission, identifying deviations from requirements of Contract Documents. State reasons for deviations.

.7 Coordinate and consider field measurements and affected adjacent Work before submitting shop drawings.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Owner's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Owner review.

.10 Keep one reviewed copy of each submission on site for reference during construction.

1.2 DOCUMENT SUBMISSIONS REQUIRED

.1 At commencement of Contract and before start of Work and as directed in the Instructions to Bidders and General Conditions of Contract submit the following:

- .1 Name of Safety Officer
- .2 Construction schedule
- .3 Shop Drawing schedule
- .4 Material delivery schedule for long lead items
- .5 Schedule of Values
- .6 Other required schedules and estimates
- .7 Permits as required by the Work

.8 Hot Work Procedure and Permits as required

.9 Pre-Job Hazard Assessment

.10 Construction Waste Management Plan

.11 Occupational Health and Safety Plan

.12 Insurance Policy- Public Liability and Property Damage Insurance Certificates

.13 Performance, Payment and Security Bonds as required

.14 Labour and Material Bonds

.15 Subcontractors' bonding

.16 Subcontractor Safety Certificates or Letter of Good Standing from an audit service provider approved by Workers' Compensation Board

.17 Subcontractor Clearance letter issued by Workers' Compensation Board

.18 Letter of good standing from the NSCSA or equivalent.

.2 During Construction:

.1 Weekly progress reports

.2 Job meeting reports and minutes with updated Construction Schedule.

.3 Shop Drawings as required

.4 Inspection and test reports

.5 Monthly Application for Payment, including the following:

.1 Updated Safety Certification valid until the end of the Work

.2 Applicable Statutory Declarations with OH&S Summary

.3 Updated construction and material delivery schedules

.3 Also refer to Division 01 Construction Progress Documentation.

.4 Submissions required at Completion of Work are specified in Division 01.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Indicate materials, methods of construction, attachment, anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work.

.2 Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow five (5) working days for Owner's review of each submission.

.4 Adjustments made on shop drawings by Owner are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Owner prior to proceeding with Work. Make changes in shop drawings as Owner may require, consistent with Contract Documents. When resubmitting, notify Owner in writing of any revisions other than those requested.

.5 Contractor to submit and complete 'Shop Drawing Submittal Form' with all shop drawings. Shop drawings will not be reviewed without this completed form. (See Submittal Form at the end of this Section)

.1 Include a transmittal letter containing the following:

.1 Date.

.2 Project Tile and Number.

.3 Contractor's Name and Address.

.2 Submissions to include the following information:

.1 Date and revision dates.

.2 Project title and number

.3 Name and Address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, dimensions, including field dimensions, and clearances. Ensure all dimensions are in metric.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Reference Standards.

.7 Operating weight.

.8 Wiring diagrams as required

.1 Single line and schematic diagrams.

.9 Relationship to other parts of the Work.

.6 Submit electronic copy of Shop Drawings where specified in the technical Specifications.

.7 Submit electronic copy of Product data sheets or brochures where specified in the technical Specifications.

.8 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.

.9 Supplement standard information to include details applicable to Project.

.10 Allow 5 working days for Owner's review of each submittal. If upon Owner’s review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.

.11 If upon Owner’s review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.

.12 Owner’s notations on submittals are intended to ensure compliance with the Contract Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If the Contractor considers any Owner’s notation to be a change in the Work, promptly notify the Owner in writing before proceeding with the Work.

.13 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of Work proceeds. When resubmitting, notify Owner in writing of any revisions other than those requested by the Owner

.14 Engineer's Stamp:

.1 Provide Engineer's stamp (registered to practice in the province of Nova Scotia) on shop drawings as specified in other sections or as required by authority having jurisdiction. This will certify that assemblies meet loads and design criteria as specified or required under applicable codes.

1.4 SAMPLES

.1 Submit duplicate samples as requested in specification sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Owner's address.

.3 Notify Owner in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is to be chosen by Owner, submit full range of samples.

.5 Adjustments made on samples by Owner are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Owner prior to proceeding with Work.

.6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 SUBSTITUTIONS

.1 Substitutions are not permitted after award of the Contract except in the case of extenuating circumstances confirmed to be beyond the control of the Contractor. Should the need for a substitution arise, the Contractor shall submit their Request for Substitution to the Owner on the Form included at the end of this Section. Should the Request for Substitution be approved, the Owner will incorporate the substitution into the Contract via a formal Contract Change. Should the Request for Substitution be rejected, the Owner will notify the Contractor of the reasons for doing so.

1.6 PROGRESS PHOTOGRAPHS

.1 Submit progress photographs in accordance with Division 01 Construction Progress Documentation.

1.7 CLOSEOUT SUBMITTALS

.1 In accordance with Division 01 Closeout Submittals.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Observe construction safety measures of:

- .1 National Building Code.
- .2 National Fire Code of Canada
- .3 Nova Scotia Building Code Act (RSNS 89, c.46) and Regulations
- .4 Occupational Health and Safety Act SNS 1996, Chapter 7 and Regulations, including but not limited to:
  - .1 Workplace Health and Safety Regulations
  - .2 First Aid Regulations
  - .3 Workplace Hazardous Material Information System Regulations
  - .4 Occupational Safety General Regulations
- .5 Worker's Compensation Act
- .6 Nova Scotia Fire Safety Act
- .7 Dangerous Goods Transportation Act
- .8 Canada Labour Code, Canada Occupational Safety and Health Regulations, SOR/86-304 (as am. by SOR/87-623; 88-44; 88-68; 88-632; 89-479; 89-515; 90-180;91-448; 92-544; 94-33; 94-263; 95-286;95-533; 96-294; 96-400; and 96-525)

.2 All construction sites shall conform to the Nova Scotia Smoke Free Places Act.

.3 In case of conflict or discrepancy within the cited references above, the more stringent requirement shall apply.

.4 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building.

1.2 OWNER'S CONTRACTORS

.1 All Owner's Contractors that are noted in this contract providing work on this site are under the guidelines of the General Contractor for Health and Safety issues.

1.3 SUBMITTALS

.1 Contractor's site-specific Health and Safety Plan: Within 5 days after date of Notice to proceed and prior to mobilization to site, submit site-specific Health and Safety Plan. Contractor's site-specific Health and Safety Plan must address items as follows:

- .1 Safety and health risk or hazard analysis for each site task and operation found in work plan.
- .2 Personnel training requirements including as follows:
  - .1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.
  - .2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance

requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan.

.3 Personal protective equipment (PPE) program addressing:

.1 Donning and doffing procedures.

.2 PPE selection based upon site hazards.

.3 PPE use and limitations of equipment.

.4 Work mission duration, PPE maintenance and storage.

.5 PPE decontamination and disposal.

.6 PPE inspection procedures prior to, during, and after use.

.7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.

.8 Medical surveillance requirements for personnel assigned to work at site.

.9 Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.

.10 Site control measures to be employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.

.11 Decontamination procedures for both personnel and equipment.

.12 Emergency response requirements addressing: Pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

.13 Written respiratory protection program for project activities.

.14 Procedures dealing with heat and/or cold stress.

.15 Confined space entry procedures Occupational Safety certificate for entry required.

.16 Spill containment program if drummed waste material is generated, excavated, stored, or managed on site.

.2 Owner will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within two (2) days after receipt of plan. Revise plan as appropriate and resubmit plan to Owner within two (2) days after receipt of comments from Owner.

1.4 REGULATORY REQUIREMENTS

.1 Conform to Occupational Health and Safety legislation applicable to the place of the Work.

.2 Comply with specified standards and federal, provincial and municipal regulations to ensure safe operations at work site and other areas occupied by the Contractor.

.3 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.5 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Ensure Health and safety guidelines provide for safe and minimal risk working environment for site personnel and minimize impact of activities involving contact with any hazardous materials or hazardous wastes on general public and surrounding environment.

1.6 RESPONSIBILITY

.1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HAZARD COMMUNICATION REQUIREMENTS

.1 Comply with Workplace Hazardous Materials Information System Regulation – NS Occupational Health and Safety Act.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, SOR/86-304 (as am. by SOR/87-623; 88-44; 88-68; 88-632; 89-479; 89-515; 90-180; 91-448;92-544; 94-33; 94-263; 95-286;95-533; 96-294; 96-400; and 96-525), Part X - Hazardous Substances.

.3 Provide Owner with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site.

1.8 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.2 Assign responsibility and obligation to Health and Safety Officer to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety.

1.9 HEALTH AND SAFETY OFFICER

.1 Employ and assign to Work competent and authorized representative as Health and Safety Officer. Health and Safety Officer must:

.1 Have minimum 2 years' site-related working experience specific to activities associated with general contractor.

.2 Have basic working knowledge of specified occupational safety and health regulations.

.3 Be responsible for completing Health and Safety Training Session.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Health and Safety Plan.

.5 Be on site during execution of Work.

1.10 PERSONNEL HEALTH, SAFETY, AND HYGIENE

.1 Training: Ensure personnel entering site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.

.2 Levels of Protection: Establish levels of protection for each Work area based on planned activity and location of activity.

.3 Personal Protective Equipment:

.1 Furnish site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and well maintained.

.4 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include the following procedures as minimum:

.1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.

.2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.

.3 Ensure reflective vests are worn on Construction Work zones.

.5 Emergency and First-Aid Equipment:

.1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.

.2 2 self-contained breathing apparatus units; blankets and towels; stretcher; and 1 hand-held emergency siren.

.3 As a minimum, provide 1 certified first-aid technician on site at all times when work activities are in progress.

.6 Site Communications:

.1 Post emergency numbers near site telephones.

.2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.

.3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.

.4 Furnish selected personnel with 2-way radios.

.5 Safety Meetings: Conduct mandatory weekly safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on an as-needed basis.

1.11 SITE CONTROL

.1 Meet specified requirements.

.2 Confined Space Entry Program: Meet requirements of:

.1 Nova Scotia Occupational Health and Safety Act.

.2 Canada Labour Code, Canada Occupational Safety and Health Regulations, SOR/86-304 (as am. by SOR/87-623; 88-44; 88-68; 88-632; 89-479; 89-515; 90-180;91-448; 92-544; 94-33; 94-263; 95-286;95-533; 96-294; 96-400; and 96-525),Part XI - Confined Spaces.

1.12 SITE CLEANING

.1 Maintain public right-of -ways, easements, paths, sidewalks, roads, and the like, free of construction debris, dirt and any harmful material originating from construction activities.

.2 Protect sewerage from accumulation of dirt and other material. Clean sewers, walks and roads as frequently as required to ensure that they are clear of materials, debris and excavated material.

.3 Remove snow and ice from public rights-of way within the boundaries of the construction site.

1.13 FIRE SAFETY REQUIREMENTS

Apply fire protection methods, good housekeeping practices and local and Underwriter's Laboratories Canada fire regulations including, but not limited to, National Fire Code of Canada, Nova Scotia Fire Safety Act, (R.S.N.S.2002, c6) and the Provincial Building Code Act, (R.S.N.S.1989, c46). Provide ULc approved fire extinguishers, and other firefighting services and equipment, except where more explicit requirements are specified as the subject of individual Sections.

.1 Fire Separations:

.1 Ensure that fire separations are installed to maintain total integrity and that they are not breached by Work following their installation.

.2 Replace fire separations which have suffered a lessening of their required rating during construction.

.2 Fire watch and Evacuations:

.1 Maintain a fire watch at all times during activities involving open combustion including, but not limited to use of torches, fires and welding equipment.

.2 Maintain a system of evacuation alarms, strategically located throughout the construction site and capable of being heard by workers wearing hearing protection in high noise areas of the workplace.

.3 Provide for multiple means of egress from the construction areas for workers during all phases of construction and brief workers periodically on such escape routes.

1.14 REPORTING FIRES

.1 Post a notice indicating the location of the nearest fire alarm box and telephone, including the emergency telephone number.

.2 Report immediately all fire incidents to the Fire Department.

.3 The person reporting the fire shall ensure that the Fire Department is adequately directed to the scene of the fire.

.4 Give location of fire, name or number of building and be prepared to verify the civic address, or other definitive location.

1.15 OH&S DOCUMENT SUBMISSION

.1 Ensure that the OH&S Document submission applies to the Work of this specific project and site.

.2 Submit two copies of a project specific OH&S Document at the Pre-Construction Meeting for all Work to be performed on the project. OH&S Document to be submitted prior to commencement of any work on site, or delivery of any materials to the site.

.3 OH&S Document submission shall contain specific information detailing the methods and procedures to be implemented by the contractor to ensure compliance with the OH&S Act and regulations and any other contractual requirements specified in this section and to ensure:

.1 The health and safety of all persons at or near the Work including the public.

.2 Compliance with requirements of the regulatory agencies.

.3 All employers, contractors, constructors, suppliers, employees, self- employed persons, owners, providers of service, architects and engineers performing Work under this contract comply with the requirements of all applicable regulatory agencies.

.4 As safety considerations change during construction, provide explanation of updates to safe work practices as Work progresses with the submission of the monthly Health Safety and Environment Declaration Form.

.4 OH&S Document submission shall contain specific information detailing the methods used. Where changes to the Work require changes to the OH&S methods and procedures, modify and resubmit the OH&S Document to the Owner prior to implementing the changes.

.5 Organize OH&S Document in the form of a typed instructional manual using 8- 1/2" x 11" paper with tabbed sections Headings. Document to be titled ‘OH&S Document-(project title)’.

.1 Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size of text pages.

.6 Arrange the contents under the following Headings.

.1 Employee OH&S Training:

.1 Include a statement indicating that all employees, including subcontractors working on this specific project have met their respective company specific training requirements and training requirements of the OH&S Act and Regulations and as such are deemed competent by their employer to perform their duties. Include proof of designated competence where required by the OH&S Act.

.2 Company Safety Policy:

.1 Provide the company's Occupational Health and Safety Policy. Include information pertaining to the employees' rights under the OH&S Act and provide details on the assignment of responsibility and accountability of managers, supervisors and employees.

.3 Company Safety Rules:

.1 Provide company general safety information applying to every work environment where the company has staff and indicating compliance to the policy on items including but not limited to: use of personal protective equipment, CSA approval on such items, use of alcohol or non-prescription drugs. Include company disciplinary policy for violations of company rules or violations of OH&S Act or Regulations including policy for dealing with violations of subcontractors.

.4 Hazard Identification System:

.1 Provide details on the system to be used to evaluate the project to identify potential hazards, as well as details on the project specific hazards identified from said assessment. Include information on procedures and schedules for regular inspections, procedures for ensuring the reporting of hazards and the accountability of persons responsible for the correction of hazards. Describe the scheduling and recording of informal inspections, formal written inspections, written hazard assessments and include each in the assessment. Indicate how ongoing hazard assessments and the methods to control these new hazards will be communicated to all persons on the project. Identify the subcontractor's responsibilities for hazard assessments and inspections of his own work and employees.

.5 Supervision:

.1 Identify in the submission, the general contractor's employee designated to control and oversee all OHS related matters on the project including the monitoring of all activities of all persons on the project and the methods and procedures to be used by this employee to ensure compliance with the OH&S Act and regulations.

.6 Emergency Action Plan:

.1 Provide the following information:

.1 First aid services - include location of first aid stations, attendants, services, supplies and the posting of first aid information.

.2 Posting of information - include information identifying trained emergency response staff, phone location for emergency use, project address and all necessary emergency service phone numbers and locations.

.3 Fire Protection - Advise local firefighting authority in the area of Work of project startup date, provide firefighting authority access to and a tour of the project prior to commencement of work. Advise the

firefighting authority during the project of any work that would impede fire apparatus response, including but not limited to reduced overhead clearances, erecting of fences/gates/barricades and digging of trenches. Include reporting of fires procedures.

.4 Work Stoppage-provide information on the securing of areas during emergencies and how information is communicated to persons present on site during such emergencies.

.5 Contingency plan to correct the Safety Plan in the case that significant failure of the safety Plan is identified such as repeated identification of unsafe conditions by one or more of the Consultant, Owner or other non-Contractor personnel.

.7 Joint Occupational Health & Safety Committee - Provide rules of procedure under which the JOHSC will operate including but not limited to membership details, meeting schedules, posting of meeting minutes, chairing of meetings and the role of the JOHSC on the project. Provide information on safety representatives roles and responsibilities on the project during periods where a JOHSC is not in place.

.8 Project security/access plan-provide a site plan including but not limited to: vehicle access, employee access, gates, fencing, hoarding and general site security.

.9 Communication of Information-describe methods to be used to communicate all OH&S related information to all persons on the project. Information is to include but not be limited to the posting of- first aid information, JOHSC members' names, JOHSC meeting minutes, copies of the OH&S Act and regulations, copies of ongoing inspections and hazard assessments etc.

1.16 MONTHLY OH&S SUMMARY SUBMISSION

.1 Submit the OH&S Summary information section in the form of a Health Safety and Environment Declaration Form, completed and signed with each monthly Application for Payment

END OF SECTION

1.1 GENERAL

.1 Work of this Section will be performed in such a manner as to prevent environmental damage to watercourses and surrounding property.

.2 It is the responsibility of the Contractor to ensure that regulations respecting protection of the environment during Work of this Section are understood and followed. Obtain necessary permits and approvals from authorities having jurisdiction.

.3 Cover and/or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for roads used to access site.

.4 Provide environmental safety with regards to sediment run-offs from excavated areas.

1.2 REFERENCE DOCUMENTS

.1 Provincial Department of the Environmental Construction and Demolition Debris Disposal Site Guidelines (latest edition).

1.3 EROSION & SEDIMENT CONTROL PLAN

.1 Contractor to provide Erosion and Control Plan to Local Authority having jurisdiction. This submission must be stamped and signed by a geotechnical engineer registered to practice in Nova Scotia.

1.4 EROSION CONTROL

.1 Perform grading work to minimize the effects of erosion on site.

.2 Maintain erosion control measures and monitor daily until site is taken over by Owner.

.3 The site is to be left so that no environmental damage to watercourses and surrounding properties may occur after completion of contract.

1.5 POLLUTION CONTROL

.1 Prior to the commencement of construction activities, prepare a contingency plan which addresses procedures to follow in the event of a pollution incident and ensure that all staff are aware of these procedures. Provide copy of contingency plan to the Owner.

.2 Immediately report any environmental emergency, such as an oil spill of a contaminant, to the Provincial Environmental Emergency Department.

.3 Maintain temporary pollution control device installed under this contract until the Work is completed as specified in the Project Document. Remove control measures, if directed by the Consultant or Owner, prior to project completion.

.4 Keep paved surfaces clean.

1.6 SEDIMENT RUN-OFF

.1 Contractor to put in place tight controls for sediment run-off, provide a plan that satisfies this, for all excavated areas.

1.7 DISPOSAL OF WASTES

.1 Do not bury rubbish nor waste materials on site unless approved.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.8 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

END OF SECTION

Part 1 General

1.1 INSPECTION

.1 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Owner instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before test is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Owner or Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. Upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

.5 In the absence of the Owner the inspector will field and comment on questions related to scope of work in contract. All questions affecting design intent or affecting changes to scope of work must be processed through contract administration paperwork involving Contractor, Owner and Consultant.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by the Contractor for purpose of inspecting and/or testing bearing capacity and placement/compaction of base materials and backfills. Cost of such services will be borne by the Contractor. Results to be shared with .

.2 Employment of inspection/testing agencies does not relax responsibility of the Contractor to perform Work in accordance with Contract Documents.

.3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Testing Agency at no cost to Owner. Contractor shall cover all costs involved for retesting and reinspection.

1.3 ACCES TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

.1 Notify Owner and appropriate Testing Agency in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Owner it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Owner.

1.6 REPORTS

.1 Contractor will submit four (4) copies of inspection and test reports to Owner with copy to Owner.

.2 Contractor will provide copies to Subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs called for in Contract Documents or required by law of Place of Work shall be paid for by Contractor.

1.8 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in location acceptable to Owner.

.3 Prepare mock-ups for Owner's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Owner will assist in preparing a schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Owner.

.7 Mock-ups may remain as part of Work unless otherwise directed by the Owner.

.8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.9 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

.2 Refer to applicable Section for definitive requirements; substantial performance of the building requires specific complete testing reports before Substantial Completion is submitted to Owners.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.2 WATER SUPPLY

.1 The Contractor is responsible to make temporary connections and remove and reinstate service at completion of the Work.

1.3 TEMPORARY POWER AND LIGHT

.1 General Contractor to provide new power from utility server for paver to building for proper voltage required All new temporary paver to be coordinated and verified and inspected by the local utility provider.

.2 Provide and pay for a distribution center of suitable voltage and capacity and number of outlets to provide all necessary power for all trades on site.

.3 The installation shall meet all the requirements of the Canadian Electrical Code and shall be inspected by the Nova Scotia Power Commission prior to energization. Safety shall be of the utmost importance and the General Contractor shall ensure all sub-contractors follow safe practices when using the temporary electrical power system. Any unsafe work undertaken by any workers on site shall be reported immediately to the safety representative on site.

.4 Temporary power shall be removed from site only after all work is complete and the Owner has agreed to its removal. Remove all cabling and poles and re-instate the existing conditions to the satisfaction of the Owner.

.5 General Contractor shall bear all costs related to premature removal of the temporary electrical power.

.6 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Owner provided that warranties are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for construction purposes for more than three (3) months.

1.4 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

1.5 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for any temporary communication lines and equipment necessary for own use and use of Owner.

END OF SECTION

Part 1 General

1.1 CONSTRUCTION FACILITIES GENERAL

.1 Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.

.2 Maintain temporary construction facilities in good condition for the duration of the Work.

.3 Remove temporary construction facilities from the Place of the Work when no longer required.

1.2 INSTALLATION AND REMOVAL

.1 Include in the work construction and temporary facilities required as construction aids or by jurisdictional authorities, or as otherwise specified. Install to meet needs of construction as Work progresses. Maintain construction and temporary facilities during use, relocate them as required by the Work, remove them at completion of need and make good adjacent Work and property affected by their installation.

.2 Construct temporary Work of new materials unless use of previously-used materials is approved prior to commencement of Work.

.3 Ensure that structural, mechanical, and electrical characteristics of temporary facilities are suitable and adequate for use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, location, stability, protection, structural sufficiency, removal, or any other cause. Provide for shutting down, restarting or modifying electrical, mechanical or fire protection services required to complete the work.

1.3 SITE STORAGE LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 CONSTRUCTION PARKING

.1 Coordinate parking with Owner's Project Manager.

1.5 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.6 SANITARY FACILITIES

.1 Contractor to provide and maintain sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.7 CONSTRUCTION SIGNAGE

.1 NO signs or advertisements, other than warning signs, are permitted on site.

.2 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in English, with graphic symbols.

.3 Maintenance and Disposal of Site Signs:

.1 Maintain approved signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Owner.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.2 TEMPORARY CONSTRUCTION FENCING

.1 Contractor to erect temporary site fencing to enclose the work area. Site Plan to indicate limits of enclosures. Contractor to review the exact location of fencing and entrances with the Owner.

1.3 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, and as required by governing authorities.

1.4 ACCESS TO SITE

.1 Provide and maintain access roads, ramps and construction runways as may be required for access to Work.

1.5 PUBLIC TRAFFIC FLOW

.1 Provide and maintain qualified and trained signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.6 FIRE ROUTES

.1 The Contractor shall maintain access to property including overhead clearances for use by emergency response vehicles, in accordance with applicable codes and regulations.

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 The Contractor shall protect surrounding private and public property from damage during performance of Work.

.2 The Contractor shall be responsible for damage incurred.

1.8 PROTECTION OF BUILDING FINISHES

.1 The Contractor shall provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 The Contractor shall provide necessary screens, covers, and hoardings.

.3 The Contractor is responsible for damage incurred due to lack of or improper protection.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Within text of specifications, reference may be made to reference standards contained within each section.

.2 Conform to these standards, in whole or in part as specifically requested in specifications.

.3 For products specified by reference standards, the onus shall be on the supplier to establish that such products meet reference standard requirements, be number 1 quality, no seconds or opened boxes or crates will be accepted. The Owner may require affidavits from the supplier, or inspection and testing at the expense of the supplier, or both, to prove compliance. Products exceeding minimum requirements established by reference standards will be accepted for the Work if such products are compatible with and harmless to Work with which they are incorporated

.4 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.2 PRODUCT AVAILABILITY AND DELIVERY TIMES

.1 Promptly upon signing Contract and periodically during construction, review and confirm Product availability and delivery times. Ensure that Products are ordered in sufficient time to meet the construction progress schedule and the Contract Time.

.2 If a specified Product is no longer available, promptly notify Owner. Owner will take action as required.

.3 If delivery delays are foreseeable, for any reason, promptly notify Owner.

.1 If a delivery delay is beyond the Contractor's control, Owner will provide direction.

.2 If a delivery delay is caused by something that was or is within the Contractor's control, the Contractor shall propose actions to maintain the construction progress schedule for Owner's review and acceptance.

1.3 AVAILABILITY

.1 Products specified by manufacturer's name, brand name or catalogue reference shall be the basis of the bid and shall be supplied for the Work without exception in any detail, subject to allowable substitutions as specified.

.2 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Owner of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.3 In event of failure to notify Owner at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Owner reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, alteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Remove and replace damaged products at own expense and to satisfaction of Owner.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by the Owner. Contractor to unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Owner in writing, of conflicts between specifications and manufacturer's instructions, so that Owner may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Owner to require removal and re-installation at no increase in Contract Price or Contract Time.

.4 Provide proper environmental conditions as referenced for installation, storage and handling as per the manufacturer's instructions.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of high standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Owner if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Owner reserves the right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Owner, whose decision is final.

1.8 PRODUCT QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective (not seconds), and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

1.9 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

END OF SECTION

Part 1 General

1.1 INFORMATION PROVIDED BY THE OWNER

.1 MUNICIPAL MAIN BUILDING, 181 COLDBROOK VILLAGE DRIVE

.1 Geotechnical Report: available.

.2 Site Survey: available.

.2 MUNICIPAL OPERATIONS BUILDING, 67 COLDBROOK VILLAGE DRIVE

.1 Geotechnical Report: available.

.2 Site Survey: available.

.3 HANTS BORDER STP, 208 AVON STREET, HANTSPORT

.1 Geotechnical Report: not available.

.2 Site Survey: not available.

.4 GREENWOOD STP, 989 MEADOWVALE ROAD

.1 Geotechnical Report: not available.

.2 Site Survey: not available.

.5 WATERVILLE STP, 1307 COUNTY HOME ROAD, KINGS COUNTY

.1 Geotechnical Report: not available.

.2 Site Survey: not available.

.6 ALDERSHOT STP, 00 NS-341 (HIGHWAY 341), UPPER DYKE

.1 Geotechnical Report: not available.

.2 Site Survey: not available.

1.2 REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.3 SURVEY REFERENCE POINTS

.1 Locate and confirm permanent reference points prior to starting site work. Preserve and protect permanent reference points on site during construction.

.2 Do not change or relocate reference points without prior written notice to Owner.

.3 Report to Owner when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Require registered land surveyor to replace reference points in accordance with original survey.

1.4 SURVEY REQUIREMENTS

.1 Establish sufficient permanent benchmarks on site, referenced to established benchmarks by survey control points.

.2 Confirm that existing survey reference points are in accordance with Owner's survey and property limits

.3 Establish lines and levels, located and lay out, by instrumentation.

.4 Establish pipe invert elevations.

.5 Stake batter boards for foundations.

.6 Establish foundation column locations and floor elevations.

.7 Establish lines and levels for mechanical and electrical work.

.8 Maintain a complete, accurate log of control and survey work as it progresses. Record locations with horizontal and vertical data in project record documents.

1.5 EXISTING UTILITIES AND STRUCTURES

.1 Before commencing excavation, drilling or other earthwork, establish or confirm location and extent of all existing underground utilities and structures in area of Work.

.2 Promptly notify Owner if underground utilities, structures, or their locations differ from those indicated in the Contract Documents or in available project information. Owner will provide appropriate direction.

.3 Record locations of maintained, re-routed and abandoned utility lines.

1.6 VERIFICATION OF EXISTING CONDITIONS

.1 Where work specified in any Section is dependent on the work of another Section or Sections having been properly completed, verify that work is complete and in a condition suitable to receive the subsequent work. Commencement of work of a Section that is dependent on the work of another Section or Sections having been properly completed, means acceptance of the existing conditions.

.2 Verify that ambient conditions are suitable before commencing the work of any Section.

.3 Ensure that substrate surfaces are clean, dimensionally stable, cured and free of contaminants.

.4 Notify Owner in writing of unacceptable conditions.

1.7 RECORDS

.1 Maintain a complete, accurate log of control and work as it progresses.

.2 Record locations of existing, maintained, re-routed and abandoned service lines.

1.8 SUBMITTALS

.1 Submit name and address of Surveyor to Owner.

.2 On request of Owner, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform with Contract Documents.

.4 Location Certificate:

.1 Submit survey certificate and complete survey signed by Surveyor and verified by Owner certifying that elevations and locations of complete Work are in conformance, or non-conformance with Contract Documents, complete with all setbacks, etc.

.2 Submit to local authority having jurisdiction, Owner and Consultant.

.5 All certificates form part of the Closeout Submittals.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Except where otherwise specified in technical Specifications or otherwise indicated on Drawings, comply with requirements of this Section.

1.2 MANUFACTURER'S INSTRUCTIONS

.1 Install, erect, or apply Products in strict accordance with manufacturer's instructions.

.2 Notify the Owner, in writing, of conflicts between the Contract Documents and manufacturer's instructions where, in the Contractor's opinion, conformance with the Contract Documents instead of the manufacturer's instructions may be detrimental to the Work or may jeopardize the manufacturer's warranty.

.3 Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.4 Provide manufacturer's representatives with access to the Work at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities.

1.3 CONCEALMENT

.1 Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas after review by Owner and authority having jurisdiction.

.2 Provide incidental furring or other enclosures as required.

.3 Notify the Owner in writing of interferences before installation.

1.4 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.

.2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.

.3 Use non-corrosive fasteners and anchors for securing exterior work and in spaces where high humidity levels are anticipated.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

1.5 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Bolts shall not project more than one diameter beyond nuts.

1.6 FIRE RATED ASSEMBLIES

.1 When penetrating fire rated wall assemblies, completely seal voids with fire-stopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.7 SOUNDS RATED ASSEMBLIES

.1 When penetrating sound rated walls, completely seal voids with fire-stopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.8 LOCATION OF FIXTURES, OUTLETS AND DEVICES

.1 Consider location of fixtures, outlets, and devices indicated on Drawings as approximate.

.2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, and regulatory, including barrier free, requirements.

.3 Promptly notify Owner in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.

1.9 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

.1 Adequately protect parts of the Work completed and in progress from any kind of damage.

.2 Promptly remove, replace, clean, or repair, as directed by Owner, work damaged as a result of inadequate protection.

.3 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.

1.10 REMEDIAL WORK

.1 Notify Owner of, and perform remedial work required to, repair or replace defective or unacceptable Work. Ensure that properly qualified workers perform remedial work. Coordinate adjacent affected Work as required.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of any element of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.

.2 Obtain Owner's approval before cutting, boring or sleeving load-bearing members.

1.2 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.3 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Remove and replace defective and non-conforming Work.

.3 Provide openings larger than 200 mm in diameter in non-structural elements of Work for penetrations of structural, mechanical and electrical Work. Openings smaller than 200 mm diameter will be provided by the Subtrades requiring same.

.4 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.5 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.6 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.7 Restore work with new products in accordance with requirements of Contract Documents.

.8 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.9 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.10 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

.11 Use sleeves where required or specified in the work of other sections.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANING

.1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.

.2 Provide on-site containers for collection of waste materials and debris. Refer to Waste Management and Disposal in Division 01.

.3 Provide and use clearly marked separate bins for recycling.

.4 Remove waste material and debris from site at end of each working day. Dispose of waste materials and debris off site.

.5 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.6 Provide adequate ventilation during use of volatile or noxious substances.

.7 Use only cleaning materials recommended by manufacturer of surface to be cleaned.

.8 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

.9 Schedule cleaning operations so that dust, debris and other contaminants will not fall on wet, newly painted surfaces, or contaminate building systems.

1.2 FINAL CLEANING

.1 Refer to the General Conditions of the Contract, and to Contract Closeout Procedures.

1.3 NON-PERFORMANCE

.1 If, in the opinion of the Owner, adequate clean-up is not occurring or has not occurred, the Owner reserves the right to provide clean-up services necessary, the cost of which shall be charged against the contract.

END OF SECTION

Part 1 General

1.1 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of adjacent areas and site.

.2 Provide temporary security measures as required.

1.2 WASTE REDUCTION WORKPLAN

.1 Follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.2 Describes management of waste.

1.3 MATERIALS SOURCE SEPERATION PROGRAM

.1 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.

.2 Locate separated materials in areas which minimize material damage.

.3 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition, if required. Transport to approved and authorized recycling facility or to users of material for recycling.

1.4 WASTE PROCESSING SITES

.1 Contact the local Waste Management Department.

1.5 DISPOSAL OF WASTES

.1 Burying of rubbish and waste materials on site is prohibited.

.2 Disposal of waste, volatile materials, mineral spirits, oil, paint thinner, into waterways, storm, or sanitary sewers is prohibited.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Store materials to be reduced, reused, recycled and salvaged.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect structural components not removed or demolished from movement or damage.

.4 Support affected structures. If safety of building is endangered, cease operations and immediately notify Owner.

.5 All pallets to be returned to manufacturer/supplier once product has been installed.

1.7 SCHEDULING

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the work.

1.8 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

1.9 CLEANING

.1 Remove tools and waste materials on completion of work and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 SUMMARY OF SECTION

.1 Administrative procedures preceding preliminary and final inspections of Work.

.2 Substantial Performance for the overall building as per Contract Documents.

1.2 INSPECTION AND DECLARATION

.1 Schedule, make arrangements for and administer Substantial Performance and Final Inspections and close out in the following stages.

.2 Contractor's Inspection:

.1 Determination that Project meets requirements for substantial performance and final inspection is the responsibility of the Contractor.

.2 Contract work must be 97.5% achieved in accordance with the documents. Substantial Performance only can be achieved when all the life safety certifications and testing have been completed. Refer to Section 01 78 00 – Closeout Submittals.

.3 The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects; repair as required. Contractors' review list to be forwarded to the Owner. Notify the Owner in writing of satisfactory performance of the contractor's Inspection and that corrections have been made. Request a Substantial Performance Final Inspection.

.3 Substantial Performance and Final Inspection:

.1 When the items noted above are complete, request a substantial performance inspection of the Work by the Owner and the Contractor. If Work is deemed incomplete by the Owner, complete the outstanding items and request a reinspection.

.2 Substantial performance inspections shall be scheduled to begin within eight working days of the Contractor's request.

.3 Present at the substantial performance inspection will be:

.1 The Consultant and with their required Sub-consultants;

.2 The Owner's representatives; and

.3 The Contractor with any of their required Subcontractors.

.4 If the Owner deems the project has not attained Substantial Performance, the cost of the Consultant's additional visits will be borne by the contractor and the amount deducted from the original contract price.

.5 The Owner will compile a substantial performance deficiency list at this inspection and issue it to the Contractor and Owner.

.6 The Contractor shall correct substantial performance deficiencies before a date agreed upon by the Contractor and Owner.

.7 Upon the Owner's approval of substantial performance, the Contractor shall submit an application for a substantial performance certificate.

.8 When the Contractor has determined that these corrections have been completed in a satisfactory manner by their inspection they shall schedule a total inspection

by the Owner, and the Owner's representatives if required, within five working days of the Contractor's request.

.9 Upon the Owner's approval of performance, the Contractor shall submit an application for a total performance certificate.

1.3 SUBSTANTIAL PERFORMANCE

.1 The Owner will issue a Certificate of Substantial Performance when satisfied outstanding deficiencies noted during inspections prior to the substantial performance inspection have been corrected.

.2 A list of remaining deficiencies to be rectified before final acceptance will be attached to the Certificate of Substantial Performance.

.3 Make submissions specified in this section.

1.4 CERTIFICATE FOR RELEASE OF AMOUNT DUE AT SUBSTANTIAL PERFORMANCE

.1 The Owner will issue a certificate for release of money in an amount equal to the amount due the Contractor under the Agreement providing that the Owner is satisfied the Work has been substantially completed, in Nova Scotia, holdback amount is 10% contract price.

.2 The certificate shall indicate the date of substantial performance.

.3 Payment shall be due 60 days, this varies province to province, after the date of substantial performance.

1.5 TOTAL PERFORMANCE

.1 The Owner will issue a Certificate of Total Performance once satisfied that outstanding deficiencies noted during inspections have been corrected and the Work is completed and is so certified by the Consultant.

.2 The date of the Total Performance Certificate will commence the required 30 day period before release of final payment.

.3 A list of remaining deficiencies to be rectified before final acceptance will be attached to the Total Performance Certificate.

.4 Make submissions specified in this Section.

1.6 CERTIFICATE FOR RELEASE OF FINAL PAYMENT

.1 The Owner will release Final Payment (Final Certificate for Payment) 30 days after date of Total Performance Certificate, provided the Owner is satisfied the Work has been completed.

.2 The certificate will be in an amount equal to the remaining money due the Contractor under the Contract, and shall indicate the date of final performance.

.3 Payment shall be due upon date of issue of Certificate for Release of Final Payment.

1.7 WARRANTIES

.1 Establishment of Warranties:

.1 Warranties shall commence on date of substantial performance certificate.

.2 Warranty Period:

.1 The Owner will advise the Contractor of defects observed during warranty periods.

.2 Thirty days before expiration of warranties the Owner's representatives, the Owner and the Contractor will inspect the Work as arranged by the Contractor noting defects of products and workmanship.

.3 The Contractor shall immediately remedy such noted defects

1.8 TOTAL COMPLETION OF THE WORK

.1 Upon completion of correction of defects arising during the one year warranty period, the Contractor will issue a Certificate of Total Completion.

1.9 CLOSE-OUT SUBMITTALS

.1 In accordance with Section 01 78 00 Closeout Submittals.

END OF SECTION

Part 1 General

1.1 SUMMARY OF SECTION

.1 Requirements of closeout submissions and operating and maintenance manual including:

- .1 As-built drawings, samples, and specifications.
- .2 Equipment and systems information.
- .3 Product data, materials and finishes, and related information.
- .4 Record Documents.
- .5 Operation and maintenance data.
- .6 Spare parts, special tools and maintenance materials.
- .7 Warranties and bonds.
- .8 Completion listing and description and cost associated for all changes and revisions to the contract documents
- .9 Commissioning Report.

1.2 SUBMISSION

.1 General:

- .1 Prepare records, instructions and data by personnel experienced in the work or maintenance and operation of described products. Submit to the Owner's Project Manager.
- .2 Copy will be returned after review, with Project Manager's comments.
- .3 Revise content of documents as required prior to final submittal.

.2 Substantial Performance:

- .1 Submit with application for Substantial Performance Certificate the following Life Safety Certification documents. <u>All items listed must be provided before Substantial Performance is provided.</u>
  - .1 Certificate of final inspection report from electrical utility or inspection.
  - .2 Certificate of verification of the emergency lights/exit light system.
  - .3 Potable water test.
  - .4 Backflow test certificate.
  - .5 Certification of Structural Compliance with the Design.

.3 Total Performance:

- .1 Submit with application for Total Performance Certificate:
  - .1 Final project record drawings.
  - .2 Performance bonds which shall remain in effect for one year after take-over date.
  - .3 Completed Liability Insurance Policy extended for one year from takeover date.

.4 Written guarantee covering all workmanship and materials used in the Work.

.5 Certificate from Worker's Compensation Board.

.6 Maintenance bonds as specified.

.7 Maintenance Manual.

.8 Spare parts and maintenance materials and list.

.9 Extended warranties.

1.3 OPERATING & MAINTNANCE MANUALS

.1 Format:

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219mm x 279mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.2 Contents - Each Volume:

.1 Table of Contents: provide title of project:

.1 Date of submission; names, addresses, and telephone numbers of

.2 Consultants and Contractor with name of responsible parties;

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.6 Certificates of Acceptance:

.1 Relevant certificates issued by authorities having jurisdiction.

1.4 RECORD DOCUMENTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site, for the Owner, one record copy of:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to the Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Record, as the Work progresses, changes and deviation in the location of Work and such other approved changes that occur during progress of Work, to ensure that an accurate record is provided for future Work of the Project.

.4 Contractor to provide white prints, and record changes of the Work on these prints in red ink.

- .1 One set of paper copies to be left on site.
- .2 As built drawings should be protected in a sealed polyvinyl tube. Tube to be labeled as ‘AS BUILT DRAWINGS’ c/w the Name of the contractor and the date of Substantial Completion.
- .3 As built shop drawings and all close out documents to be in binders labeled as above, placed in a labeled plastic bin.

.5 Dimension location of concealed Work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offset of runs on concealed Work.

.6 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.7 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.8 Keep record documents and samples available for inspection by Owner.

.9 Submit project record documents to the consultant. Copies will be returned after review with consultant's comments. Revise contents of documents as required prior to final submission.

.10 Contractor to provide one USB memory stick to Owner, containing all the AS BUILTS, Shop drawings, Job minutes, Change order log and back up info, and all other required documents as identified in Section 01 78 00.

1.5 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Consultant.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.6 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Provide servicing and lubrication schedule, and list of lubricants required.

.3 Include manufacturer's printed operation and maintenance instructions.

.4 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.5 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.6 Additional requirements: As specified in individual specification sections.

.7 For Commissioning procedures and report requirements, refer to Commissioning document.

1.7 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.8 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Owner. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.9 MAINTENANCE MATERIALS

.1 Provide maintenance materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue all items. Submit inventory listing to the Project Manager. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.10 CONTRACTOR’S AS-BUILT DRAWINGS

.1 Submit final as-built drawings in the form specified in Section 01 32 00 – Construction Progress Documentation to Consultant.

1.11 PROJECT RECORD DRAWINGS

.1 Transfer all information marked up on the as-built drawings during the progress of the Work to a master set of record drawing files provided by the Owner, in electronic format.

.2 Mark revised drawings as "RECORD DRAWINGS".

.3 Submit completed record drawings in hard copy and electronic form to Owner.

1.12 SPARE PARTS, MAINTENANCE MATERIALS, AND SPECIAL TOOLS

.1 Supply spare parts, maintenance materials, and special tools in quantities specified in technical Specifications sections.

.2 Ensure spare parts and maintenance materials are new, not damaged nor defective, and of same quality and manufacture as installed Products.

.3 Provide tags for special tools identifying their function and associated Product.

.4 Deliver to and store items at location directed by the Owner at the Place of the Work. Store in original packaging with manufacturer's labels intact and in a manner to prevent damage or deterioration.

.5 Catalogue all items and submit inventory listing to the Owner. Include Owner reviewed listings in Operation and Maintenance Manual.

1.13 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue all items. Submit inventory listing to the Project Manager. Include approved listings in Maintenance Manual.

1.14 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of the Owner.

1.15 CHANGES TO THE CONTRACT

.1 Contractor to provide a complete listing of all changes to the original contract documents, indicating the description and the associated cost of each change.

1.16 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and bonds until time specified for submittal.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Demonstrate and provide training to Owner's personnel on operation and maintenance of equipment, building envelope, and systems prior to scheduled date of Substantial Performance of the Work.

.2 The Owner will provide list of personnel to receive training and will coordinate their attendance at agreed upon times.

.3 Coordinate and schedule demonstration and training provided by Subcontractors and Suppliers.

1.2 SUBMITTALS

.1 Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in technical Specifications.

.2 Consultant and Owner will review submittal and advise Contractor of any necessary revisions.

.3 Submit report(s) within 7 days after completion of demonstration and training:

.1 identifying time and date of each demonstration and training session,

.2 summarizing the demonstration and training performed, and

.3 including a list of attendees.

1.3 PREREQUISITES TO DEMONSTRATION AND TRAINING

.1 Testing, adjusting, and balancing has been performed in accordance with Contract Documents.

.2 Equipment and systems are fully operational.

.3 Copy of completed operation and maintenance manual is available for use in demonstration and training.

.4 Conditions for demonstration and training comply with requirements specified in technical Specifications.

1.4 DEMONSTRATION AND TRAINING

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and system.

.2 Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.

.3 Prepare and insert additional information in operations and maintenance manual if required.

END OF SECTION

Part 1 General

1.1 COMMISSIONING AGENCY

.1 The Contractor shall retain and pay for a commissioning agency to provide commissioning services for the Project.

1.2 CONTRACTOR RESPONSIBILITIES

.1 Prepare each system ready for commissioning. Verify systems installation is complete and in operation.

.2 Coordinate commissioning with and assist commissioning agency.

.3 Perform and document verification, performance testing, adjusting, and balancing operations.

.4 Cooperate with commissioning agency and provide access to equipment and systems.

.5 Provide personnel and operate systems at designated times, and under conditions required for proper commissioning.

.6 Make instruments available to commissioning agency to facilitate spot checks during commissioning.

.7 Participate in commissioning meetings.

.8 Complete commissioning forms as requested by commissioning agency.

.9 Correct deficiencies identified in commissioning process.

.10 Incorporate commissioning data into operation and maintenance manual.

.11 Ensure that commissioning agency participates in demonstration and training as specified in Section 01 79 00 – Demonstration and Training.

.12 Provide instruments necessary for commissioning.

1.3 COMMISSIONING AGENCY RESPONSIBILITIES

.1 The commissioning agency shall:

.1 Prepare a commissioning plan, including systems to be commissioned, forms, checklists and responsibilities of commissioning team members.

.2 Implement the commissioning plan and lead the commissioning team through start-up, verification, performance testing, training, and document preparation.

.3 Convene, chair, prepare and distribute minutes of commissioning meetings.

.4 Supervise commissioning activities and witness inspections and tests.

.5 Make periodic site visits for the purpose of selective checking of accuracy of commissioning form submissions, witness testing, and review of mock-ups.

.6 Review content of operations and maintenance manual.

.7 Provide instruments necessary for commissioning.

1.4 CONSULTANT RESPONSIBILITIES

.1 The Consultant may be requested by the Owner to participate or assist with the following:

- .1 Commissioning meetings;
- .2 Coordinate commissioning agency's involvement in Shop Drawing review process;
- .3 Review verification and performance test results and direct the Contractor to correct defects or deficiencies in the Work;
- .4 Initiate Change Orders or Change Directives identified as necessary by the commissioning process; and
- .5 Review final commissioning report.

1.5 OWNER RESPONSIBILITIES

.1 The Owner will:

- .1 Assign operations and maintenance personnel to participate in meetings, and witnessing of demonstration, and training.
- .2 Designate a person to acknowledge receipt of reports.
- .3 Participate in commissioning meetings.
- .4 Coordinate commissioning agency's involvement in Shop Drawing review process.
- .5 Review verification and performance test results and direct the Contractor to correct defects or deficiencies in the Work.
- .6 Initiate Change Orders or Change Directives identified as necessary by the commissioning process.
- .7 Review final commissioning report.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-21, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations.

.2 Abbreviations for electrical terms: to CSA Z85.

.3 CSA Electrical Bulletins in force at the time of tender submission, while not identified and specified by number in this division, are to be considered as forming part of the related CSA Part II standard and must be complied with.

.4 CSA Z462:21, Workplace Electrical Safety

.2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 CAN/ULC-S524:2019, Canadian Standard for Installation of Fire Alarm Systems

1.3 CONTRACT DRAWINGS

.1 No omissions in the drawings or specifications are intended and the Contractor shall give due consideration to this matter. Any work or material referred to in the drawings and not in the specifications, or vice versa, shall be furnished and performed as though fully covered in both. This shall apply particularly to the drawings where descriptions are sufficiently detailed so as to require little or no mention in the specifications. Items indicated on floor plans and not on riser diagrams, or vice versa, shall be considered fully covered by both.

.2 Runs of conduit and outlet locations indicated on the drawings are diagrammatic and exact locations must be determined by the Contractor as the work proceeds, with due regard to the structure and the work of other trades. The Engineer reserves the right to alter locations of conduit and outlets up to 10'-0" without extra cost, provided that the Contractor is advised prior to roughing in. The Contractor shall make any changes dictated by structural requirements, or conflicts with other trades, without charge to the Owner.

.3 Any error or omission shall be referred to the Engineer whose decision shall be final.

.4 Building dimensions shall not be scaled from the electrical drawings but shall be obtained from the Architectural and/or Structural drawings. Any discrepancy between the drawings and the building shall be questioned before proceeding with the installation.

1.4 WORK INCLUDED

.1 The specifications complement the drawings in describing the supply and installation of the complete electrical systems. These systems shall include but not be limited to the following:

- .1 120/208V-3 phase-4 wire Power Systems
- .2 347/600V-3 phase-4 wire Power Systems
- .3 277/480V-3-phase-4 wire Power Systems
- .4 AC Level-2 Electric Vehicle (EV) Charging Systems
- .5 DC Level-3 Electric Vehicle (EV) Charging Systems
- .6 Low Voltage Control System
- .7 Communications System

.2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for EV chargers, panel boards, transformers, breakers, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Certificates:

- .1 Provide CSA certified equipment and material.
- .2 Permits and fees: in accordance with General Conditions of contract.

.4 Manufacturer's Field Reports: submit following reports to the municipality and consultant with manufacturer's written report, within 1 week of review, verifying compliance of work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

- .1 Manufacturer’s field reports for field quality-control support.
- .2 Manufacturer’s field reports for system startup support.

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit for review single line electrical diagrams, drawing 24” x 24” minimum size, under plexiglass and locate as indicated.

- .1 Electrical distribution system in main electrical room, and all sub electrical rooms where applicable.
- .2 Communication riser in main communication room and all communication closets.

.3 Shop drawings:

- .1 The Contractor shall prepare shop drawings showing in detail the design and construction of all equipment, panels, cabinets, lighting fixtures, etc. Digital copies of all such drawings shall be submitted to the Engineer for review, and the work shall not be executed until such review has been obtained.
- .2 All shop drawings, other than standard manufacturers' dimensions and data sheets, shall bear the stamp of a registered professional Engineer who shall be fully responsible for the Engineering content of such drawings.

.3 Prior to submission the Contractor shall carefully check all shop drawings to ensure that they comply with the drawings and specifications in both intent and detail. No consideration will be given to shop drawings submitted without this approval and review from the Contractor. Appendix A at the end of Section 01 33 00 must be completed and signed and must accompany all shop drawing submissions. Submissions not accompanied by Appendix A will be returned for re-submission.

.4 The Engineer's review of these drawings is general and is not intended to serve as a check and shall not release the Contractor from responsibility for errors or from the necessity of checking the drawings himself, or of furnishing the materials and performing the work as required by the plans and specifications.

.5 High quality electronic "PDF" copies of shop drawings are preferred.

.4 Quality Control:

.1 Provide CSA certified equipment and material.

.2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.

.3 Submit test results of installed electrical systems and instrumentation.

.4 Permits and fees: in accordance with General Conditions of contract.

.5 Submit, upon completion of Work, load balance report as described in PART 3 - Load Balance.

.6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Consultant.

.5 Manufacturer's Field Reports: submit to Consultant manufacturer's written report, within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 QUALITY ASSURANCE

.1 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.

.1 Employees registered in provincial apprentices' program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.

.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.7 MINIMUM STANDARDS

.1 All work shall be performed in accordance with Canadian Electrical Code, National Building Code, and CAN/ULC-S524, as minimum standards. These standards together with all Local or Municipal Rules, Regulations, and Ordinances shall be considered as the Latest Approved Editions at the time of Tender Closing. In no instance, shall the standard established by the drawings and specifications, be reduced by any codes.

1.8 PERMITS, FEES AND INSPECTION

.1 The Contractor shall obtain all inspections and permits required by all laws, ordinances, rules, and regulations by public authority having jurisdiction in this district and shall obtain certificates of such inspections and shall pay all charges in connection therewith. The final certificate of inspection shall be obtained before final payment for work shall be considered due.

.2 In no instance shall the standard established by the drawings and specification be reduced by any codes, etc.

1.9 SUPERVISION

.1 The Contractor shall provide supervision and sufficiently qualified foreman to ensure that the job proceeds in a proper and efficient manner. If in the opinion of the Engineer, such personnel are not competent to carry out their work, the Contractor shall replace these men immediately upon written request of the Engineer.

1.10 OTHER TRADES

.1 The Contractor shall co-operate and investigate with other trades to make maximum use of the spaces and avoid conflict with pipes, ducts, equipment radiation, etc. Shop drawings shall be prepared by the Contractor indicating the route of main conduits and ducts which shall be submitted to the Engineer for review.

.2 The Contractor shall co-operate with other Contractors on the site and carry out the work, in such a way, as not to hinder or hold-up the work of other trades.

.3 The Contractor shall consult with other Contractors, where their respective installations conflict and shall re-route conduits, ducts, outlets, equipment, etc., as required, subject to the approval of the Engineer.

.4 The Contractor shall obtain from the mechanical and other trades complete detailed wiring diagrams of equipment requiring connections and shall be responsible for pointing out any discrepancies or the reason why they cannot be adhered to.

1.11 FIRE PENETRATIONS

.1 Where conduits and cables pass through fire separations and sound rated separations, including floors, walls, membranes, etc., provide a metallic sleeve, or core drill to (1") radius larger than the conduit or cable passing through the fire separation. Construct a ceramic fibre insulation dam, or dams as required, and fill the penetration with 3M PUTTY 303 or 3M CAULK CP25. A minimum depth of (2") of putty or caulk is required. As an alternate system, pack the space with ceramic fibre insulation to within 1 inch of each face of the separation, and fill the remaining voids with (1") of Electrovert AA 400 FLAMESEAL PUTTY, on each side. Either installation shall be in strict accordance with manufacturers recommendations and to suit UL and/or ULC requirements. All such work shall be performed by personnel familiar and experienced with this type of work.

1.12 GUARANTEE

.1 The Contractor shall guarantee all work, under this Division, free from defects, for a period of one (1) year, after final acceptance of the entire project. The Contractor shall make good all defects, other than normal wear and tear, during the life of the guarantee.

Notwithstanding the above, longer guarantees may be required for specific installations or equipment, as indicated in other sections of the specifications.

.2 Guarantees shall be submitted in writing, bound where more than one is required, and submitted to the Engineer for review. Each guarantee shall include:

.1 Project name and address.

.2 Guarantee time period (commencement date shall be the date as shown on the project final certificate of completion, unless otherwise indicated).

.3 Clear and concise definition of what is guaranteed.

.4 Signatures of company officers of the Contractor and/or manufacturers, as applicable.

1.13 RECORD DRAWINGS

.1 One (1) set of white prints will be provided for record drawing purposes. Maintain project "as-built" record drawings and accurately record significant deviations from the Contract Documents, caused by site condition or Contract change. Mark changes on white prints in "RED".

.2 Prior to start of testing, balancing and adjusting, finalize production of as-built drawings.

.3 Testing, balancing and adjusting to be performed using as-built drawings.

.4 Turn over the as built drawings to the owner at the completion of the project.

1.14 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedure and Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for all electrical equipment and materials for incorporation into manual.

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.

.3 Safety precautions.

.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.15 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors and off ground in dry location]and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect EV chargers from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove padding, packaging materials, pallets, crates, as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Contract materials shall be new and C.S.A. approved for their specific use.

.2 For the purposes of uniformity similar materials shall be of one manufacturer (i.e. all panels and switchgear; transformer as is possible; etc.)

.3 To avoid the possibility of the work being delayed, the Contractor shall order all materials as soon as possible, and he shall report at once to the Engineer any delays in the delivery of materials which would hold up the completion of the job.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.

.2 All power and control wiring associated with the mechanical systems of this project shall be performed by the electrical contractor but only to the limits of what is actually shown on the electrical drawings.

.3 The Contractor shall obtain from the mechanical and other trades complete detailed wiring diagrams of equipment requiring connections and shall be responsible for pointing out any discrepancies or the reason why they cannot be adhered to

.4 Prior to rough in of electrical services, co-ordinate location of all mechanical equipment with the mechanical contractor where applicable.

2.3 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of the municipality and consultant.

.2 Decal signs, minimum size [175 x 250 mm].

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with [labels] [nameplates] as follows:

.1 Nameplates: lamicoid 3 mm black face, white core, lettering accurately aligned and engraved into core, mechanically attached with self tapping screws.

.2 Sizes as follows:

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

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

.3 Wording on labels, nameplates to be approved by the municipality prior to manufacture.

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

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. XXX-X" as directed by the municipality.

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

.8 Terminal cabinets and pull boxes: indicate system and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages.

.10 EV Chargers: identify with labels to match engineering drawings.

2.6 WIRING IDENTIFICATION

.1 Identify wiring on both ends of phase conductors of feeders and branch circuit wiring by circuit number at all panel boards, pull and junction boxes, outlet and equipment connections, and all devices. Labels to be installed in such a manner as to present white area with information in "flagged" position. Wrap around conductor in "U" fashion and have it adhere to itself. Identify neutrals and bond wires indicating which circuits with which they are used.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Type	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

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

.1 Paint outdoor electrical equipment [equipment green finish to EEMAC Y1-1-1955].

.2 Paint indoor switchgear and distribution enclosures [light grey to EEMAC 2Y-1-1958].

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

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

2.9 SPRINKLER PROTECTION

.1 All equipment such as panelboards, transformers, switchboard, relay cabinets, control cabinets, etc., installed in areas equipped with sprinkler protection, shall be fitted with sprinkler hoods and shall comply with the intent of C.E.C. Sections 26-008 and Appendix B-26-008.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of municipal representative.

.2 Inform the design consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of approval to proceed from consultant.

3.2 INSTALLATION

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

3.3 NAMEPLATES AND LABELS

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

3.4 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to the pouring of concrete, laying of concrete block, and the installation of drywall partitions.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.5 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 10” (305mm) horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors.

.1 Locate disconnect devices in mechanical rooms on latch side of floor.

3.6 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

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

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Panelboards: as required by Code or as indicated.

3.7 CO-ORDINATION OF PROTECTIVE DEVICES

.1 This contractor shall provide a fault study with suggested over current (phase and ground fault) settings in accordance to IEEE standards. The contractor shall provide an Arc Flash study as detailed in CSA Z462-21 - Workplace electrical safety and shall be complete with detailed Arc Flash Warning labels that meet the requirements of CEC Section 2-306 and Z462-21 clause 4.3.5.4 affixed to the equipment. The studies shall be prepared and

submitted to the consultant for review. All costs associated with the studies shall be included in the tender price.

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

3.8 FIELD QUALITY CONTROL

.1 Load Balance:

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following test:

.1 Power distribution system including phasing, voltage, grounding and load balancing.

.2 Circuits originating from branch distribution panels.

.3 EV Chargers and its control.

.4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

.5 Systems: fire alarm system, communications.

.6 Insulation resistance testing:

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

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

.3 Check resistance to ground before energizing.

.4 Test all wiring included in the Contract, to ensure there are no shorts or grounded conductors and that insulation values are as required by the Canadian Electrical Code

.5 The Engineer reserves the right to use any piece of electrical equipment, device, or material installed under this Contract for such reasonable lengths of time and at such times as he may require making a complete and thorough test of the same, before the final completion and acceptance of the work

.6 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 – CLOSEOUT SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.9 SYSTEM STARTUP

.1 Instruct the operating personnel, a representative from the municipality, in operation, care and maintenance of systems, system equipment and components.

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

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

3.10 CLEANING

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

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

.3 On completion of this project, the Contractor shall remove all debris and leave the site neat and tidy. Equipment shall be checked for proper fitting and alignment, adjusted, cleaned, repainted where necessary, and left in first class condition.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 SECTIONS INCLUDES

.1 Materials and installation for wire and box connectors.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CAN/CSA-C22.2No.18.1:13 (R2022), Metallic Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
- .2 CSA C22.2No.65-93 (R1999), Wire Connectors.

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

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

.3 National Electrical Manufacturers Association (NEMA)

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.

.3 Divert unused wiring materials from landfill to metal recycling facility as approved by consultant.

Part 2 Products

2.1 MATERIALS

.1 For branch circuit wiring #10 AWG and smaller, use spring type pressure wire connectors with current carrying parts of copper, or copper alloy, and insulating cap, sized to fit copper conductors as required.

.2 Joints for all other wiring shall be made using T & B colour keyed compression type connectors, 54000 series, and T & B series compression tools. Insulation shall consist of a first layer of compound type tape followed by a layer of Scotch #33 vinyl tape.

Part 3 Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors [cables] and:

- .1 Install spring type wire connectors for branch circuit and control wiring #10 AWG and smaller. Plier tightens all wire nut joints and connections.
- .2 Install pressure type wire connectors for branch circuit wiring larger than #10 AWG. Insulating tapes to overlap successive wraps by a minimum of 50%.
- .3 The splicing of feeder conductors is not acceptable.

.2 All connections shall be made electrically and mechanically secure. The sizes of connectors shall be according to manufacturer's recommendations for each wire size and combination of wires.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.3 REFERENCE STANDARDS

.1 CSA C22.2 No .0.3-09 (R2019), Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131:17 (R2022), Type TECK 90 Cable.

1.4 PRODUCT DATA

.1 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 GENERAL

.1 Wire and cable shall conform fully to the latest specifications of the Canadian Standards Association (C.S.A.), Electrical and Electronic Manufacturers Association of Canada (EEMAC), the Insulated Power Cable Engineers Association (IPCEA), and the American Society of Testing Materials (ASTM).

2.2 BUILDING WIRES

.1 Wiring on circuits exceeding 50 volts to ground shall be of soft drawn stranded copper of 98% conductivity and of full size and AWG gauge. Insulation shall be cross-linked polyethylene RW-90 rated 600 volts. Wiring shall be continuously colour coded as follows:

.1 Phase A Red

.2 Phase B Black

.3 Phase C Blue

.4 Neutral – White/Grey

.5 Ground Green

.6 Where extra colours are required for three way switches, etc., they shall be yellow.

.2 Conductors pertaining to the wiring of thermostats, motorized valves, damper actuators, and electric pneumatic relays shall be stranded copper conductor of 95% conductivity and of full size and AWG gauge. Insulation shall be thermoplastic "TW" rated 600 volts. Colour code shall be orange and brown. Minimum size shall be No. 18 AWG.

.3 Colour coding shall be by insulation colour as follows: Phase conductors on sizes up to and including No. 2 AWG. Neutral, ground and bond conductors on sizes up to and including No. 3/0 AWG. Approved coloured tape, in lieu of coloured insulation, may be used for phase conductors sized No. 1 AWG and larger, neutral, ground and bond conductors sized No. 4/0 AWG and larger.

.4 Where noted and utilized in lieu of noted Copper conductors Aluminum conductors No. 8 and larger will be 8030 ACM alloy, compacted un-directional stranded, fully annealed conductors.

2.3 ARMOURED CABLES

.1 AC-90 cables shall be soft drawn solid copper of 98% conductivity and of full size and AWG gauge. Insulation shall be cross-linked polyethylene rated 600 volts. Outer armour shall be of interlocking aluminum. Colour coding of AC-90 cable shall be as follows:

.1 Phase Conductors Black or Red

.2 Neutral Conductor White

.3 Ground Conductor - Bare

2.4 CONTROL CABLES

.1 Type LVT: Soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket.

Part 3 Execution

3.1 GENERAL CABLE INSTALLATION

.1 The Contractor shall run all circuits so that the voltage drop, in no case exceeds 3% of the line volts. The neutral wire, wherever it is run shall be continuous with no fuses, switches, or breaks of any kind.

.2 The installation of more than 3 conductors in a run of conduit is permissible provided C.E.C. Section 4-004(1) is adhered to with respect to the derating of the conductors.

.3 The minimum conductor size for all 15-amp branch circuits is to be #12 AWG. For 15 amp 120 volt branch circuits, the following table shall be followed:

Branch Circuit One-Way Length from Panel to Load (Including Vertical Drops)	Phase Wire Size	Dedicated Neutral Wire Size	Shared Neutral Wire Size	Bond Wire Size
Up to (80'-0") (24.38 m)	#12 AWG	#12 AWG	#10 AWG	#12 AWG
(81'-0" to 125'-0") (24.68 m to 38.1 m)	#10 AWG	#10 AWG	#8 AWG	#12 AWG
(126'-0" to 185'-0") (38.4 m to 56.38 m)	#8 AWG	#8 AWG	#6 AWG	#10 AWG

.4 The requirements for accommodating larger common or "shared" branch circuit neutral conductors where the application might warrant such, could restrict the use of some types of AC-90 cables. In certain instances however, the installation of AC-90 cable (where permissible), and the use of "oversized" neutral conductors where required, is more than acceptable.

.5 Oversized #10 AWG branch circuit wiring conductors to be extended to outlet box of device they feed. Oversized #8 or #6 AWG branch circuit wiring conductors to be extended from panelboard to junction box located on wall or in ceiling space directly above outlet or device they feed. A #8 or #6 AWG wire can be reduced to #10 AWG for vertical portion of drop only.

.6 All "stranded" conductors are to be "twisted together" prior to any types of terminations taking place, but not necessarily limited to, some of the following areas:

.1 Receptacles.
.2 Light switches.
.3 Neutral terminal strips.
.4 Bonding terminal strips.
.5 Circuit breakers.
.6 Disconnect switches.
.7 Magnetic and manual starters.
.8 Magnetic contactors.
.9 Relays.
.10 Terminating lugs, etc.

3.2 INSTALLATION OF BUILDING WIRES

.1 Where pulling wires and cables, the use of an approved lubricant only will be permitted. No wires or cables shall be pulled in conduits until such conduits are free from moisture and in no case shall wires be pulled until approval of the Engineer is obtained.

.2 All various types of cables are to be installed parallel or perpendicular to building lines and shall be adequately secured to the building structure at not more than (60") (1500 mm) intervals or as otherwise indicated, in such a manner as to ensure they are protected from potential types of mechanical damage occurring. Install independent supports for cabling in ceiling spaces, and do not use those of other trades. Do not secure cables to

mechanical systems piping or ducts, suspended ceiling support wires, etc.. The laying of "unsupported" cables of any types whatsoever directly atop ceiling grid system is strictly prohibited.

.3 Install and secure surface cables directly to underside of metal decking and/or ceiling slab where installed in any concealed ceiling spaces.

.4 Cables are "always" to be installed as high as possible to underside of structure.

.1 Where cables are installed in same direction as steel joists, they are also to be secured as high as possible to underside of metal decking and/or structure. Do not install cables in the upper portions of any Q-Decking.

.5 The grouping together of cables to form a "bundle" for securing purposes, is acceptable provided that the following procedures are adhered to.

.1 In addition to securing cables at (60") (1500 mm) intervals to structure, multiple or bundled groups of cables (including low voltage types), shall be tye-wrapped together at mid-point between each structure support, or every (30")(750 mm). Secure to structure at (60") (1500 mm) intervals, and secure together (between structure supports) at (60") (1500 mm) intervals.

.6 AC 90 cable used in wood frame construction shall be run parallel to building lines and secured in accordance with C.E.C. 12 610. The incoming (Panel Side) grounding conductor shall be secured to the grounding screw of each outlet box, before connecting to the other grounding conductors. Twist all grounding conductors together and install connector. Push all grounding conductors to the back of the outlet box, such that the grounding conductors obstruct as little room as possible.

.7 After all wiring devices have been installed, the Contractor shall test all systems to make sure there are no grounds, leaks, or shorts. Such tests shall be performed to the satisfaction of both the inspection authority having jurisdiction and the Engineer.

3.3 INSTALLATION OF ARMOURED CABLES

.1 All AC-90 cable shall be run parallel to building lines, secured in accordance with C.E.C. 12-618 and shall be adequately clamped and "ty-rapped" to the building structure in such a manner that they are protected from mechanical damage. This contractor shall install his own supports for cabling in ceiling spaces and he shall not use those of other trades or secure cabling to pipes, ducts, suspended ceiling support wires, etc.. The laying of cables directly atop ceiling grids is strictly prohibited. The incoming (Panel Side) grounding conductor shall be secured to the grounding screw of each outlet box, before connecting to the other grounding conductors. Twist all grounding conductors to the back of the outlet box, such that the grounding conductors obstruct as little room as possible.

.2 All flexible conduit or AC-90 fixture feeds shall originate from the side of the outlet box and not from the box cover. Where 3 or 4 drops extend from one outlet box, the box shall be a minimum (4¾") (119 mm) square. There shall be no more than 4 drops from any one box. All flex or AC-90 cables used for fixture drops are to be secured within [12"] [300mm] of the junction box.

.3 Grouping of AC-90 cables shall be limited to a maximum of eight current carrying conductors, including associated oversized neutral conductors where phase sharing occurs.

.4 The following examples incorporate uses of both common and dedicated (separate) branch circuit neutral conductors:

.1 Maximum of two runs of #12/4 conductor cables, including common (oversized) branch circuit neutral in each.

.2 Maximum of two runs of #12/3 conductor cables, including (oversized) branch circuit neutrals (if not 3 phase, 3 wire), plus one run of #12/2 cable.

.3 Maximum of four runs of #12/2 conductor cables, each including a separate, dedicated branch circuit neutral conductor.

.5 Where dedicated or separate branch circuit neutral conductors are non phase sharing, they need not be sized larger than phase conductors they accompany unless specifically indicated otherwise.

.6 AC90 may be utilized as a fixture drop. A fixture drop is defined as that portion of AC-90 cable or flexible conduit being used to make final connection between "accessible" type junction or outlet box located in ceiling space (above T-bar ceiling) and its respective light fixture.

.7 AC90 may be utilized as a wiring device drop. A wiring device drop (drop to receptacle and light switches) is defined as that portion of AC-90 cable being used to make final connection between "accessible" type junction or outlet box located in ceiling space (above T-bar ceiling) and its respective wiring device.

.1 There shall be not more than four drops from any one box regardless of size. All AC-90 cables used for fixture drops are to be secured within (12") (300 mm) of the junction box. Each fixture is to be complete with its own separate fixture drop originating from junction box located within same room.

.2 Provide 20 amp O.C. protection for "all" lighting branch circuits, unless specifically indicated otherwise.

.3 No. 12 AWG and No. 14 AWG Type AC-90 cables may be used where total fixture drop "loads" do not exceed the following:

.1 Maximum of 1800 watts at 120 volts using #12 AWG drop.

.2 Maximum of 1300 watts at 120 volts using #14 AWG drop.

.8 Separate pig-tail type leads shall be provided in each light fixture junction/outlet box for "final" connections to fixture drops. These pig-tail leads are to be "only" connected to light fixture "returns" and associated "neutral" conductors.

3.4 INSTALLATION OF CONTROL CABLES

.1 The installation of "surface" wiring on walls or in open (non-enclosed) type ceilings, shall be Type EMT conduit complete with associated steel type connectors and couplings.

.2 EMT conduit is to be extended to within (24") (600 mm) of "all" various control devices associated with the operation of any given piece of mechanical equipment.

.3 Unless specifically indicated otherwise, liquid tight, flexible metal type conduit complete with steel type connector and steel locknut may be used for the "final" (24") (600 mm) connection between the end of the EMT conduit and the applicable control device.

.4 EMT or PVC type conduit "wall stubs" complete with flush installed device box shall be installed in all masonry or concrete partitions where, and as may be required, where plenum rated cabling is used.

.5 EMT connectors complete with nylon insulated throat or threaded type bushing shall be installed on end of EMT stub above "finish" type ceilings, etc., where plenum rated cabling is used.

.6 All EMT conduit stubs are to be "bonded" to ground as per CEC.

.7 Ground control cable shield.

3.5 STRANDED CONDUCTORS

.1 All stranded conductors prior to terminating under device bolts such as circuit breakers, switches, receptacles, etc., are to be twisted together to form a single conductor to ensure a reliable mechanical connection.

3.6 CAPACITIVE LEAKAGE WIRING METHODS

.1 The following wiring methods detailed below are designed to enhance the ability of the Owner to perform capacitive leakage tests in the future:

.1 All circuit conductors are to be individually ty-wrapped to their corresponding labelled neutral conductor in all panelboards, pull boxes and junction boxes. Enough slack conductor length should be left to enable the ability to clamp the ground detector around the individually ty-wrapped circuit conductor and its corresponding labelled neutral. This wiring method is to be neat and of good workmanship quality.

.2 The ty-wrapping of the neutral with its respective phase conductors is to be made at the closest point of entry into panelboards, pull boxes and junction boxes.

.3 The main switchboard, distribution panels, panelboards, etc. have their respective feeder phase and neutral conductors ty-wrapped together with enough slack conductor length to enable the ability to clamp the ground detector around each set of feeders. This wiring method is to be neat and of good workmanship quality. This ty-wrapping is to be located such that ease of clamping the ground detector can be accomplished without excessive exposure to live bussing.

.4 After all electrical wiring has been completed by the Electrical Sub-Contractor, he is to test the grounded electrical distribution system to ensure there are no ground shorts or grounds.

.5 All feeders or branch circuits which do not have neutral conductors are to have their respective phase conductors ty-wrapped together in accordance to the methods described previously.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

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

1.3 REFERENCE STANDARDS

.1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE 837-[02], IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association (CSA International)

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 EQUIPMENT

.1 Grounding equipment shall be to CSA C22.2 No.41.

.2 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.3 .Ground rods to be copper clad steel, (10'-0") (3,000 mm) long, by (3/4") (19mm) diameter.

.4 Ground bus in electrical rooms shall be copper, (4" x 1/4") (100 mm x (6 mm) minimum, of length as per the drawings.

.5 All ground rod clamps and fittings to be bronze or brass. All ground plate clamps and fittings to be bronze or brass.

.6 Ground conductors to be to ASA-G7.1.

.7 Insulated ground conductors are to be RW90, green, for sizes up to and including #2. Insulated ground conductors #1 and larger to be TWH, green. All ground conductors to be copper without exception.

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

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Bonding jumpers, straps.

.5 Pressure wire connectors.

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 All equipment and exposed non-current-carrying metal, conduits and parts shall be permanently and effectually grounded to meet minimum requirements of the C.E.C., and as indicated on the drawings and further specified. Standards set either by drawings or specifications which are above those covered by C.E.C. shall not be reduced under any circumstances.

.2 A complete grounding system shall be installed as indicated, which shall include but not be limited to the following:

.1 All switchgear ground busses.

.2 The neutral point of all transformers.

.3 Generally, minimum grounding shall be provided by the metallic conduit/outlet box system and by the bond wire in cables. Additional insulated ground wires, sized as per the drawings, shall be provided as follows:

.1 In all EMT conduit feeders that supply panelboards, CDP panels, FDP panels, MCC's, and transformers - all sized as per C.E.C. Table 16.

.2 All non-metallic conduit systems (i.e., - PVC conduit).

.3 A separate green bond conductor sized as per Table 16 of the C.E.C. shall be installed in each EMT conduit run for branch circuit wiring.

.4 Ground rods shall be buried in the locations as indicated on the drawings. The maximum resistance to ground, of the entire system shall not exceed 10 OHMS, and additional ground rods shall be buried, as required, to attain this value.

.5 Where ground conductors terminate at ground buses in switchboards or panelboards, the connection shall be made with a compression lug, which shall be secured to the bus with nut, bolt and two Bellevelle washers. Size of bolts shall be to suit lug and shall be properly torqued and marked.

.6 A ground bus shall be supplied and installed in the main electrical room, sub electrical rooms and the main communications room and sub communication rooms, all as indicated on the drawings. Connections to these busses shall be via two hole, compression lugs and compression fitting as indicated.

.4 Install connectors in accordance with manufacturer's instructions.

.5 Protect exposed grounding conductors from mechanical injury.

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

.7 Install bonding wire for flexible conduit, connected at one end to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.8 Install separate ground conductor to outdoor lighting standards.

.9 Connect building structural steel and metal siding to ground by welding copper to steel.

.10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.11 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.

3.2 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Electrical Vehicle Chargers, Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

3.4 COMMUNICATION SYSTEMS

.1 Install grounding connections for communication systems as follows:

.1 Sound, alarm, security systems, communication systems for EV chargers as indicated by manufacturer.

3.5 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the municipality representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, size 1½" x 1½" x 1/10", surface mounted, suspended, set in poured concrete walls and ceilings.

.2 All strut to be galvanized.

.3 All threaded hanger rods to be minimum (3/8") diameter, larger if required, made from mild steel.

.4 In concrete use cast in threaded inserts wherever possible. Should additional inserts be required use a "red head" type of insert capable of carrying at least 227 kg.

.5 Supports for all conduit work shall be one hole steel pipe straps; unistrut, or equal, with necessary fittings, approved for their respective use.

.6 All pull and junction boxes, wireways, and multiple conduits shall be supported by a steel channel support system with all components, hangers, wall supports, cable clamps, etc., specifically manufactured and approved for their application.

.7 Fastening devices for cabinets, boxes, supports etc., shall be nut and bolt, expansion shields, wedge anchors, or toggle bolts, size and number to suit the application or as detailed on the drawings. Toggle bolts may not be used in plasterboard construction.

.8 Fastening devices for outlet boxes shall be nut and bolt, expansion shields, wedge anchors or caddy clips, size and number to suit the application or as detailed on the drawings.

.9 Where outlet boxes are set in drywall construction, a piece of steel stud shall be secured to either side of the outlet box or use caddy quick-mount box supports, or caddy J-1-A for side box supports.

Part 3 Execution

.1 Secure all equipment in a manner so as not to distort or cause undue stress on any components.

.2 Secure equipment to masonry, tile and plaster surfaces with lead anchors or nylon shields.

.3 Secure equipment to poured concrete with expandable inserts.

.4 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts. Toggle bolts shall not be used to secure equipment to plasterboard, drywall, or acoustic tile surfaces.

.5 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.

.6 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.7 Fasten exposed conduit or cables to building construction or support system using straps.

- .1 One-hole steel straps to secure surface conduits and cables 2” and smaller.
- .2 Two-hole steel straps for conduits and cables larger than 2”.
- .3 Beam clamps to secure conduit to exposed steel work.

.8 Suspended support systems.

- .1 Support individual cable or conduit runs with 3/8” dia threaded rods and spring clips.
- .2 Support 2 or more cables or conduits on channels supported by 3/8” dia threaded rod hangers where direct fastening to building construction is impractical.

.9 For surface mounting of two or more conduits use channels at 5’ on centre spacing.

.10 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.11 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.12 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.13 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of the Consultant.

.14 Do not support any electrical conduits, wire or equipment from ceiling system support cables. Ceiling systems support cables may be utilized to marshal AC90 drops to fixtures.

.15 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

.16 In addition to the C.E.C. conduit support requirements, all suspended conduit runs containing horizontal or vertical elbows shall have one additional support installed not greater than (12") from the midpoint of the 90° bend.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00 - Submittal Procedures.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Terminations: main and branch lugs, connection blocks, to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Pull and junction boxes, where larger than standard boxes shall be the equivalent to Type "C" or "D" boxes sized according to C.E.C. Sections 12 3000 to 12 3038. Use Type "D" for boxes up to 12" x 12" and Type "C" for boxes 12” x 12" or larger.

.2 Pull boxes shall be of sheet metal construction with all welded steel corners and screw on flat covers for surface mounting.

.3 All flush installed boxes shall be Type “D”. Covers for flush mounted pull boxes shall extend a minimum of (1") all around.

.4 Concealed junction boxes (within ceiling space) shall not be smaller than (4") square.

2.3 CABINETS

.1 Cabinets shall be steel, fabricated to C.S.A. & EEMAC Standards with baked enamel finish. Cabinet shall be EEMAC Standard Types "C", "D", or "T" as indicated on the drawings. Type "T" cabinets shall be complete with hinged door, lock, two keys, and handle, and be lined with [19 mm] (3/4") plywood.

Part 3 Execution

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations and secure them adequately to the building structure. Pull boxes installed in the middle of conduit runs without backing are not acceptable.

.2 The location of junction and/or pull boxes in suspended ceiling spaces, i.e. - dry wall, T-Bar, etc., is not to be greater than (30") above the finished ceiling and must be easily accessible.

.3 All suspended junction, pull and outlet boxes shall be supported with minimum size (3/8") threaded rods, nuts and flat washers. Threaded rods shall be secured to boxes with one flat washer and nut installed on both sides of box. One rod required for all boxes sized up to and including (4¾") square. Two rods required for boxes larger than (4¾") square, up to and including (8") square. A minimum of four rods required for all boxes larger than (8") square.

.4 Mount cabinets with top not higher than (78”) above finished floor.

.5 Install terminal block as indicated in Type T cabinets.

.6 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed (100’) of conduit run between pull boxes.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA)

.1 CSA C22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm (4”) square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 347 V outlet boxes for 347 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. (4”) (102 mm) square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 SPEC NOTE: For DND, do not use the following paragraph.

.3 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size [102 x 54 x 48 mm].

.4 (4”) (102 mm) square or octagonal outlet boxes for lighting fixture outlets.

.5 (4”) (102 mm) square outlet boxes with extension and plaster rings for flush mounting devices in finished walls.

.6 Surface outlet boxes installed below (8’-0") (2500 mm) shall be hot dipped galvanized cast "FS", or "FD" series boxes with metal coverplates.

2.3 MASONRY BOXES

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

2.4 CONCRETE BOXES

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

2.5 CONDUIT BOXES

.1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

2.6 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

.1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size [76 x 50 x 63] mm with two double clamps to take non-metallic sheathed cables.

2.7 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm (1.1/4”) and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 At each local switch, convenience outlet, receptacle, ceiling or wall fixture, continuous row of fixtures, or system unit (i.e. fire alarm, etc.) provide and install a standard pressed steel outlet box unless specifically noted otherwise. All outlet boxes shall be galvanized inside and out and set flush with finished surfaces. They shall be rigidly and securely set. Boxes shall not be mounted back to back, but separated by a minimum of (12") (305 mm), to prevent noise transmission.

.6 In centering outlets, the Contractor is cautioned to allow for radiation, pipes, ducts, etc., and for the variation in arrangement and thickness of finishes, etc. His failure to comply with this will not relieve him from the cost of necessary alterations.

.7 The Contractor shall allow for the relocation of an outlet up to (10'-0") (3048 mm) from where shown, provided he has been notified so prior to rough-in of the same.

.8 No outlet or junction box may be installed more than (30") (762 mm) above a finished ceiling.

.9 All suspended boxes are to be supported with minimum size (3/8") (9 mm) threaded rod(s).

.10 All flexible conduit fixture feeds shall originate from the side of the outlet box and not from the box cover.

.11 Flush installed (4") (100 mm) square or a (4-11/16") (119 mm) square box being used as a junction or pull box that requires a blank metal coverplate, is to have an appropriate sized, one or two gang "plaster ring" installed on same. This permits the use of a standard, one or two gang (blank) finish metal coverplate to be used, and avoids the necessity of acquiring an oversized, custom made coverplate.

.12 When installing flush boxes in metal drywall partitions, always screw a short piece of metal stud (same width as partition) to non-supported side of box.

.13 Concealed boxes installed above drywall ceilings or behind walls, are to have their locations identified on room sides of access opening frames with properly colour coded identification discs.

.14 Condulet fittings (LB, LL, LR, etc.) and their respective covers/plates are to be painted, and where concealed, have their locations identified with appropriate colour coded, (3/4") (19 mm), self adhering discs, applied to T-bar splines and/or access opening frames, in similar manner as for concealed junction and/or pull boxes, etc..

.15 Tile type extension rings are not to be used on boxes that have not been "flush" installed. They are not intended, not acceptable for "surface" type application.

.16 Install floor boxes in concrete form work, prior to concrete pour, securely set to ensure finished collar is flush with the finished floor.

3.2 IDENTIFICATION

.1 All outlet boxes shall be colour coded as per the colour coding legend for conduits and cables. Refer to Specification Section 26 05 01. Outlet boxes are to be coloured only on the inside.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)

- .1 CAN/CSA C22.2 No. 18.1-13 (R2022), Metallic Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
- .2 CSA C22.2 No. 45.1-04, Electrical Rigid Metal Conduit.
- .3 CSA C22.2 No. 56:17 (R2022), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .4 CSA C22.2 No. 83-M1985 (R2022), Electrical Metallic Tubing.
- .5 CSA C22.2 No. 211.2:06 (R2021), Rigid PVC (Unplasticized) Conduit.
- .6 CAN/CSA C22.2 No. 227.3:21, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized, sized as indicated.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings with expanded ends, galvanized, sized as indicated.

.3 Rigid pvc conduit: to CSA C22.2 No. 211.2, sized as indicated.

.4 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal, sized as indicated.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits (2”) (50 mm) and smaller. Two hole steel straps for conduits larger than (2”) (50 mm).

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at (60”) [1500mm] on centers.

.4 Threaded rods, (3/8) (10 mm) diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where 90 degree bends are required for (1") (25 mm) and larger conduits.

.3 Couplings for thinwall Type "EMT" shall be set screw type, galvanized steel. Locknuts shall be case hardened steel.

.4 Connectors for thinwall Type "EMT" shall be set screw type, galvanized steel. Locknuts shall be case hardened steel. Connectors (1¼") (32 mm) and larger shall be complete with threaded plastic bushings. Connectors less than (1¼") (32 mm) shall be complete with insulated tharoats.

.5 Couplings and connectors for P.V.C. rigid conduit shall be C.S.A. Approved for their respective use. All P.V.C. fittings shall be solvent weld type. Push-fit type fittings are not acceptable.

.6 Connectors for flexible conduit, armoured cable shall be set screw galvanized steel. Units shall be equal to T&B #3110 series, steel, and be complete with case hardened locknuts.

.7 Connectors for liquid tight flexible conduit shall be watertight, compression type galvanized steel or aluminum. Locknuts shall be case hardened. Dry type connectors may be used in dry indoor areas not exposed to liquids or moisture, if approved for use.

.8 For exposed installations of vertical runs of EMT conduit use watertight connectors and couplings. Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

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

2.5 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms.

.3 Thinwall Type "EMT" shall be used for all branch circuit wiring and all systems installed exposed on ceilings and walls unless noted otherwise. Bends, offsets, or elbows made on the job for steel conduits shall be made so that the conduit is not injured or flattened.

.4 All branch circuit wiring run in thinwall Type EMT conduit shall be complete with a No. 12 AWG minimum green insulated bonding conductor, increasing as required by Table 16 of the C.E.C..

.5 P.V.C. conduits sized (1") (25 mm) in diameter and larger shall be installed in trenches not less than (12") (305 mm) in depth from underside of concrete floor slab to bottom of trench. Conduits shall be placed on a (2") (50 mm) bed of sand and have a second (2") (50 mm) of sand placed on top (completely around) of conduits prior to backfilling.

.6 All concealed and exposed conduit shall be kept parallel to building lines and run "on the square". All conduits shall be installed to avoid proximity to steam and hot water pipes by (6") (152 mm). Conduits shall run through ceiling spaces and down in walls. No conduit shall run in or under floor slabs unless specifically indicated.

.7 All conduits shall be securely held in place by means of approved supports and in accordance with C.E.C. Sections 12-1010, 12-1114 and 12-1404. All EMT conduit straps shall be steel. Cast straps are not acceptable. EMT conduit shall be installed as a complete system and shall be securely fastened in place within one meter of each outlet box, junction box, cabinet, couplings or fittings and the spacing between supports as follows:

.1 Less than (60") (1524 mm) for (1/2") (13 mm) and (3/4") (19 mm) EMT;

.2 Less than (90") (2286 mm) for (1") (25 mm) and (1.1/4") (32 mm) EMT;

.3 Less than (120") (3048 mm) for (1.1/2") (38 mm) EMT or larger.

.8 Code approved P.V.C. rigid conduit shall be used for underground circuits and where otherwise specifically noted. Conduit shall be joined with approved connectors and P.V.C. solvent cement. The proper size bonding conductor, as per the C.E.C., shall installed in all P.V.C. conduits.

.9 No Branch circuit wiring shall run in concrete slabs. Conduit stubs in concrete shall be protected from damage during construction. Conduit openings shall be sealed with plugs or caps to prevent entrance of foreign materials. Where conduits pass through a waterproof membrane an oversize sleeve shall be installed and caulking applied to maintain the waterproof properties of the membrane. A cold cure mastic shall then be applied between sleeve and conduit.

.10 Flexible conduit, not smaller than (3/8") (10 mm) I.D., or flexible armoured cable with separate grounding conductor, and complete with insulating anti shorts, shall be used between lighting fixtures and their respective junction boxes, and where rigid or "EMT" conduit cannot be used, such as in cabinet work.

.11 Liquid tight flexible conduit, not smaller than (3/8") (10 mm) I.D., shall be used for connections to all transformers, motors and equipments, in both wet and dry areas.

.12 Upon installation of all conduits, terminate in boxes, cabinets, and fittings, or install suitable plugs or caps, to prevent the entrance of foreign materials. Conduits shall be swabbed out using a drag, consisting of tight fitting rubber washers and shall be dry before conductors are pulled in.

.13 All conduit subject to corrosive elements shall be treated with corrosion resistant compounds.

.14 Conduit shall not pass through structural members without the permission of the Engineer.

.15 A sufficient number of fittings shall be used to permit easy pulling of wires. Conduits shall be continuous, and shall be made electrically and mechanically secure throughout.

.16 Conduits shall not run directly between outlets on the opposite sides of a common partition, in order to prevent sound transmission.

.17 It is strictly prohibited to install or otherwise "conceal" any types of rigid or flexible conduits, cables, etc. "within" the uppermost, or top portions of metal type Q-Deck "flutes", regardless of their intended use(s).

.1 All or any types of wiring associated with metal type decking is to be "surface" installed on underside, or room side of same.

.18 Install conduit sealing fittings in hazardous areas. Fill with compound.

.19 Minimum conduit size for lighting and power circuits: [NPS 1/2] [13 mm].

.20 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.21 Mechanically bend steel conduit over (¾") (19 mm) diameter.

.22 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.23 Install fish cord in empty conduits.

.24 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.25 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than (3") (75 mm) parallel to steam or hot water lines with minimum of (1") (25 mm) at crossovers.

3.3 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.4 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel.

.1 Install in centre one third of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.

.1 Use cold mastic between sleeve and conduit.

.5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.5 COUPLINGS AND CONNECTORS

.1 Threaded couplings shall be used for all rigid steel threaded conduit joints. All joints in or below concrete slabs shall be thoroughly red leaded and screwed tight. No exposed threads shall be left, i.e., running thread couplings are not approved. Ericson couplings are approved.

.2 Rigid steel threaded conduit shall connect to boxes and cabinets with the use of two case hardened steel locknuts and insulated bushing. Painted area at locknut connections shall be scraped clean, and locknuts screwed tight to ensure ground continuity.

.3 Thinwall Type "EMT" couplings shall be securely tightened.

.4 Connectors for thinwall Type "EMT", liquid tight and flexible conduit or cable shall terminate at boxes and cabinets with one case hardened locknut. Painted area shall be scraped clean, and locknut screwed tight to ensure ground continuity.

.5 Couplings and connectors for rigid P.V.C. shall be cleaned with solvent and joined with cement C.S.A. approved for the purpose.

3.6 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

3.7 CONDUIT FITTINGS

.1 Install conduit fittings where required. Secure conduit in fittings and secure conduit to structure within (12") (300 mm) of fitting.

.2 Colour code cover plates, ceiling splines and access covers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

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

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

- .1 CAN/CSA-C22.2 No.47:13 (R2023), Air-Cooled Transformers (Dry Type).
- .2 CSA C9:17 (R2022), Dry-Type Transformers.
- .3 CAN/CSA-C802.2 Minimum Efficiency Values for Dry Type Transformers

.2 National Electrical Manufacturers Association (NEMA).

1.4 SHOP DRAWINGS

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate on shop drawings:

- .1 Dimensioned drawing showing enclosure, mounting devices, terminals, taps, internal and external component layout.
- .2 KVA rating.
- .3 Primary and secondary voltages.
- .4 Frequency.
- .5 Single or Three phase.
- .6 Full load efficiency.
- .7 Regulation at unity pf.
- .8 Insulation type.
- .9 Percent Impedance.
- .10 Sound levels.
- .11 'K' rating.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 TRANSFORMERS

.1 Transformers shall be of one manufacturer throughout the project.

.2 Dry type transformers: to CSA C9 02 Dry Type Transformers.

.3 Dry-type transformers: to CAN/CSA-C802.2 Minimum Efficiency Values for Dry Type Transformers.

.4 Bushings: to EEMAC GL1 3 1988.

.5 Design details:

.1 Type: ANN - dry type, air cooled.

.2 Three phase with primary and secondary characteristics as noted.

.3 150 degree C temperature rise insulation system, class 'H'.

.4 Impedance levels shall not be less than those indicated on the drawings.

.5 Voltage taps: 2 x 2½% full capacity taps above neutral, and 2 x 2½% full capacity taps below neutral.

.6 Average sound levels: standard.

.7 Transformers shall be 'K' rated for harmonic content. 'K' factors shall be as indicated on the drawings.

.8 Basic Impulse Level (BIL): standard.

.9 Hipot: standard.

.10 Mounting: floor or wall as indicated

.6 Dry transformers to be equipped with dual spade transformer lugs, PET-4-250 type, secure to transformer chassis for grounding.

2.2 ENCLOSURE

.1 Enclosures to be fabricated from sheet steel, complete with removable metal front panel. Enclosures and ventilation grills shall be dripping proof in accordance with C.E.C. 26-008.

.2 Transformers shall be mounted on vibration isolators to reduce noise transmission. These isolators shall be located between the enclosure and the housekeeping pad and shall be in addition to isolators located between the core and coil assembly and the enclosure.

.3 Finishes to be light grey enamel in accordance with Section 26 05 01 – Common Work Results – Electrical.

2.3 WINDINGS

.1 Primary and secondary coils shall be of copper conductor. Taps are to be located at front of coils for ease of accessibility.

.2 Windings shall be of the three-coil configuration, delta to wye connected unless indicated otherwise. "TEE" connected, 2 coil transformers, are not acceptable.

2.4 EQUIPMENT IDENTIFICATION

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

.2 Label size: 7.

.3 Nameplate wording: in accordance with Section 26 05 01 - Common Work Results - Electrical.

Part 3 Execution

3.1 INSTALLATION

.1 Locate, install and ground transformers in accordance with manufacturer's instructions. All transformers are to be floor mounted unless noted otherwise.

.2 Ensure adequate clearance around transformer for ventilation.

.3 Install transformers in level upright position.

.4 Remove shipping supports only after transformer is installed and just before putting into service.

.5 Loosen isolation pad bolts until no compression is visible.

.6 Make primary and secondary connections in accordance with wiring diagram.

.7 Energize transformers after installation is complete.

.8 Adjust primary taps as necessary to produce rated secondary voltage at normal load.

.9 Make conduit entry into bottom 1/3 of transformer enclosure.

3.2 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by dry type transformers installation.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International).

.1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 PANELBOARDS

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

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 208 and 600 V panelboards: bus and breakers rated for 90 A (symmetrical) interrupting capacity or as indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Minimum of 2 flush locks for each panel board.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating of mains.

.8 Mains: suitable for bolt-on breakers.

.9 Trim with concealed front bolts and hinges.

.10 Trim and door finish: as per colour schedule, baked enamel.

.11 Isolated ground bus.

.12 Include grounding busbar with 3 of terminals for bonding conductor equal to breaker capacity of the panel board.

2.2 BREAKERS

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

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

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

.4 Lock-on devices for 10 % of 15 to 30 A breakers installed as indicated. Turn over unused lock-on devices to the municipality.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Nameplate for each panelboard size 4 engraved as indicated.

.3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.

.4 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

Part 3 Execution

3.1 INSTALLATION

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

.2 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.

.3 Connect loads to circuits.

.4 Connect neutral conductors to common neutral bus with respective neutral identified.

.5 Where panels of different systems (i.e. Standard and Vital Power) supply a common patient care area, ground busses in panels to be interconnect with a minimum #6 AWG ground conductor.

3.2 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by panelboards installation.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-21, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect electrical cabinets and enclosures from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 CABINETS

.1 Construction: welded sheet steel, hinged door, latch, lock, 2 keys.

.2 Type T Terminal: surface return flange or flush overlapping sides mounting as indicated, containing (3/4”) fir plywood backboard.

Part 3 Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Mount cabinets with top not higher than (6') above finished grade/floor except where indicated otherwise.

3.2 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 – Common Work Results for Electrical.

.2 Identification Labels: size 2.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 SECTION INCLUDES

.1 Materials for moulded-case circuit breakers, circuit breakers, and ground-fault circuit-interrupters.

1.3 REFERENCE SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.4 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International).

.1 CSA C22.2 No. 5:16 (R2021) Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 BREAKERS GENERAL

.1 Moulded-case circuit breakers, Circuit breakers, and Ground-fault circuit-interrupters: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation having de-ionizing arc chambers, be trip free of operating handles on overloads with a definite indication when tripping has taken place, all for manual and automatic operation with temperature compensation for 40°C ambient.

.3 Plug-in moulded case circuit breakers: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

.4 Common-trip breakers: with single handle for multi-pole applications; tie handles will not be acceptable.

.5 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.6 Circuit breakers with interchangeable trips as indicated.

.7 Circuit breakers to have minimum 10000 A symmetrical RMS interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS

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

2.3 SOLID STATE TRIP BREAKERS

.1 Moulded case circuit breaker to operate by means of solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time, short time, instantaneous tripping for phase, ground fault short circuit protection.

2.4 OPTIONAL FEATURES

.1 Include:

.1 Shunt trip.

.2 Auxiliary switch.

.3 Motor-operated mechanism [c/w time delay unit].

.4 Under-voltage release.

.5 On-off locking device.

.6 Handle mechanism.

Part 3 Execution

3.1 INSTALLATION

.1 Circuit breakers shall be securely mounted in panelboards and tightened down to the bussing as per the manufacturer's recommended torque levels.

.2 Install breakers in quantities as indicated.

.3 Supply and install blank sections in panelboards for all unused breaker spaces.

.4 Set trip units as directed by the Engineer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

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

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International).

.1 CAN/CSA C22.2 No.4-16, Enclosed and dead-front Switches (Tri-national standard with NMX-J-162-ANCE-2016 and UL 98).

.2 CSA C22.2 No.39-13 (R2022), Fuseholder Assemblies.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 DISCONNECT SWITCHES

.1 Fusible and non fusible disconnect switches in CSA rated enclosures, size as indicated, Type "A".

.2 Provision for padlocking in "ON" and "OFF" position.

.3 Mechanically interlocked door to prevent opening when handle in "ON" position.

.4 Fuses: size as indicated, in accordance with Section 26 28 14 - Fuses - Low Voltage.

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

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indication on switch enclosure cover.

.8 Fuseholder assemblies to CSA C22.2 No. 39.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Indicate name of load controlled on size 4 nameplate.

Part 3 Execution

3.1 INSTALLATION

.1 Install disconnect switches complete with fuses if applicable.

.2 Supply all necessary mounting hardware and channel as required to mount switches.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

.1 Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.

.2 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 MATERIAL

.1 Conduits: EMT type, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

.2 Outlet boxes 4" square with single gang raised plaster ring.: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.

.3 Pull boxes shall be Type D & E of minimum length eight times the internal diameter of the largest conduit.

Part 3 Execution

3.1 INSTALLATION

.1 Install raceway system, including outlet boxes, pull boxes, coverplates, conduit, wire basket, miscellaneous and positioning material to constitute complete system. Conduits shall be reamed to ensure all burghs are removed.

.2 Conduits shall enter outlet boxes to either side or centre, to prevent cable damage by coverplate retaining screws.

.3 Install pull boxes in runs at 100' intervals, or lesser distances, as dictated by the number of bends.

.4 A 1/4" stranded nylon pull rope, or equivalent, shall be supplied and installed in each conduit run, for use by SMU-ITSS or local telephone utility.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Division 1 and the General Conditions of the Contract between the Owner and the Contractor shall deem to apply and be part of this section.

1.2 REFERENCE SECTIONS

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

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CSA-C22.2 No. 214:17 (R2021), Communications Cables (Bi-National standard with UL 444).

.2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)

.1 ANSI/TIA/EIA-568-D-2017, Generic Telecommunications Cabling for Customer Premises.

.2 ANSI/TIA/EIA-568-D.1-2017, Commercial Building Telecommunications Cabling Standard.

.3 ANSI/TIA/EIA-568-D.2-2017, Balanced Twisted Pair Cabling Components Standard.

.4 ANSI/TIA/EIA-606-C-2017, Administration Standard for Telecommunications Infrastructure.

.5 TIA-1179-(2009), Healthcare Facility Telecommunications Infrastructure Standard.

.3 Nova Scotia Government Structured Cabling Guidelines, 2010 edition.

1.4 SYSTEM DESCRIPTION

.1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fibre cables, terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.

Part 2 Products

2.1 VOICE AND DATA LINK

.1 Supply and install a system of conduits, outlets, wire, terminal blocks, patch panels, patch cords, racks, all associated fittings, hardware, etc., as indicated on the drawings and as further specified.

.2 Provide a Category 6 structured wiring system, end-to-end, to ANSI/TIA-568-D standard and as indicated on the drawings. This shall include voice and data link outlets and horizontal wiring.

.3 Each single communication outlet shall consist of one blue RJ45 jack, one (4") square 2-(1/8") deep outlet box with single gang welded tile ring, one ivory 2-port 106 adapter with one blank insert for the unused port, and one Type 302 stainless steel cover plate. The conduit stub into the accessible ceiling space shall be ¾".

.4 Each double communication outlet shall consist of two blue RJ45 jacks, one (4") square 2- (1/8") deep outlet box with single gang welded tile ring, one ivory 2-port 106 adapter, and one Type 302 stainless steel cover plate. The conduit stub into the accessible ceiling space shall be ¾".

.5 Each triple communication outlet shall consist of three blue RJ45 jacks, one two gang 3-(1/2") deep masonry box, one ivory 4-port 106 adapter with one blank insert for the unused port, and one Type 302 stainless steel cover plate (2-gang, 1-Blank, 1-Duplex). The conduit stub into the accessible ceiling space shall be 1".

.6 Each quad communication outlet shall consist of four blue RJ45 jacks, one two gang 3-(1/2") deep masonry box, one ivory 4-port 106 adapter, and one Type 302 stainless steel cover plate (2-gang, 1-Blank, 1-Duplex). The conduit stub into the accessible ceiling space shall be (1").

.7 Copper patch panels shall be EIA T568A configuration, Cat. 6, fully populated with Cat. 6 jacks and c/w mounting brackets, 24 or 48 port as indicated on the drawings.

.8 Acceptable manufacturers, provided they comply, shall be Commscope, Belden, Hubbell, Leviton, and Ortronics.

Part 3 Execution

3.1 INSTALLATION

.1 Supply and install a system of conduits, cables, outlet boxes, all associated fittings, hardware, etc., as indicated on the drawings, and as required for a complete conduit and cable system.

.2 Conduits shall enter outlet boxes to either side or centre, to prevent cable damage by cover plate retaining screws. Extend conduit to ceiling space.

.3 Connect jacks to wiring at outlets and tag cables.

.4 Connect wiring to patch panels in Communications Room and provide patch cords as required.

.5 All work shall be in accordance with ANSI/TIA-568-C. Testing of outlets, jacks, wiring, and patch panels shall be performed for each run at 250 megahertz. Testing results shall be submitted for review. Termination and testing shall be performed by personnel with a demonstrated experience in this specific line of work for a period of not less than the last three consecutive years.

.6 Colour code and identify all work in accordance with the Nova Scotia Government Structured Cabling Guidelines. Provide complete administrative records in accordance with the recommended practice for this Standard.

.7 Connect jacks to wiring at outlets and tag cables in outlets and Communications Rooms and Closets with room numbers and unique identifiers. Identify jacks and ports in accordance with Hospital Standards. Identify jacks with lamicoid nameplates (black letters on white background). Secure to wall in same manner as described for receptacles.

.8 Each cable termination (jack) is to be numerically identified according to the room fed, the communication closet it originates, the panel and position and (i.e.: a voice line from closet 73C1, jack position 15 in data panel F which feeds room 125 is to be labelled as 125 73C1 F15. Except where indicated otherwise, each drop run of CAT. 6 cable is to be duplexed, with one line of voice and one line of data. The duplex voice line is to be terminated on the left position of the faceplate. The data line is to be terminated on the right side of the faceplate and labelled following the room number. The Data line from panel M position 15 duplexed with the preceding example would be labelled M15. The complete label for this example would be 215 F15 73C1 M15.)

All drop labels are to be permanently affixed to the wall. They are to be of etched phenolic plastic or similar material ie: Lamacoid. Dymo or similar labels are not acceptable as permanent labels, however, will be permitted as temporary identification until the above permanent labels are installed. Each patch panel in a communication rack is to be clearly labelled with the letter designator associated with that panel. The label may be of the 'Dymo' type, 3/8 to ½" width, 18 to 24 point bold lettering and should read "PANEL X", where X is replaced with the appropriate letter designator. A label is to be affixed at the top center of each panel.

Each DVO termination within the above panel shall be numerically labeled with Dymo' type, (3/8) to (½") in width, 18 to 24 point bold lettering indicating the position of the DVO within the panel ie: 1 thru 47 .

.9 Connect wiring to patch panels in Communications Room.

.10 Wire shall be 4 pair No. 24 gauge EIA/TIA, Level 6, FT6 rated cable, equal to Belden 2400 (blue cable jacket). Cables may be installed through corridor ceiling spaces without the use of conduit. In such instances, cable shall be run parallel to building lines and secured within (12") of termination and at intervals not exceeding (48"). Cables to be secured to metal decking, beams and joists using Erico Cable Cat. Series J-hooks or run in existing cable tray where present and with adequate spare capacity. Where cables run to outlets, devices or equipment in walls, they shall be in thin wall Type "EMT" conduit as previously specified. Where conduit drops are required from the ceiling space through a wall to an outlet box, the conduit termination in the ceiling space shall be made with an insulated throat connector. The conduit stub shall be turned out into the accessible corridor ceiling. Routing of cables shall be from outlet to corridor and through corridor to telecommunications room or closet.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 General Conditions of the Contract between the Owner and the Supplier shall deem to apply and be part of this section.

1.2 SECTION INCLUDES

.1 Electric Vehicle Supply equipment that provides Level 2 and Level 3 EV Charging.

.2 The successful supplier shall supply the Level 2 and Level 3 Electric Vehicle Service Equipment (EVSE) providing Level 2 AND Level 3 Charging respectively, consistent with the following technical specifications and requirements outlined within this technical specification section.

.3 This successful supplier shall include the supply and delivery of following number of charging head EVSE's:

Site Location	Level 2 Chargers			Level 3 Chargers		
	# of Heads	# of Units	Unit Configuration	# of Heads	# of Units	Unit Configuration
181 Coldbrook Village Dr (Main Campus)	8	4	Dual-head	2	2	Single-head
67 Coldbrook Village Dr (EPW)	1	1	Single-head	0	0	N/A
208 Avon Street, Hantsport (Hants Border STP)	2	1	Dual-head	0	0	N/A
989 Meadowvale Rd (Greenwood STP)	2	2	Single-Head	1	1	Single-head
1307 County Home Rd (Waterville STP)	1	1	Single-Head	0	0	N/A

700 NS Highway 341, Upper Dyke (Aldershot STP)	1	1	Single-Head	0	0	N/A

.4 The EVSE's shall be built, tested, and shipped by one manufacturer, so there is one source of supply.

.5 Along with their pricing, all equipment supplier bidders shall submit (a) complete shop drawing submittal for the equipment to be purchased; (b) a copy of this specification section (i.e., Section 34 71 13.31 Electric Vehicle Service Equipment) with initials beside each requirement indicated either ("C") for compliant bid or ("NC") for non-compliant bid; and (c) confirmation of delivery time from the date of receiving a purchase order.

.6 The Municipality of the County of Kings will award this project to a contractor in the amount of the successful tender bid for the EVSE's. The Contractor will be responsible for receiving and storage, off-loading, installation, start-up, and commission as well as the warranty of the units.

.7 The supplier shall be responsible for the field installation of all necessary components as supplied. These components may not be necessarily listed in their entirety within the design drawings and specifications. The supplier is nonetheless responsible for their installation. This includes supplementary materials that are required for its installation.

.8 The supplier shall be responsible for the parts and labour component of the five (5) year warranty. The five (5) year warranty shall commence on the day of commissioning of the EVSE's.

1.3 REFERENCE SECTIONS

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

1.4 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-21, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations.

.2 CSA-C22.2 No.280, Electrical Vehicle Supply Equipment

.3 CSA-C22.2 No.281.1, Personal Protection Systems for EV Supply Circuits

.4 CSA-C22.2 No.282, Plugs, Receptacles and Couplers for Electric Vehicles

.5 CSA-C22.2 No.332:22, Electric vehicle cable (Trinational standard with MMXK-738-ANCE and UL 2263)

.6 CSA Electrical Bulletins in force at the time of tender submission, while not identified and specified by number in this division, are to be considered as forming part of the related CSA Part II standard and must be complied with.

1.5 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 26 05 01 – Common Work Results for Electrical

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 EV SUPPLY EQUIPMENT

.1 EVSE shall be of one manufacturer throughout the project.

.2 Performance Details:

.1 Ambient Temperature: Minus 40 to 50 deg C

.2 Relative Humidity: Zero to Ninety-Five percent

.3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

.4 Surge Withstand: 6kV at 3000A

.5 EV Charging Levels:

.1 Level 2 Chargers:

.1 Single Vehicle, AC Level 2 at up to 7.2 kW per vehicle

.2 Dual Vehicles, AC Level 2 at up to 7.2 kW per vehicle

.2 Level 3 Chargers:

.1 Dual Vehicles, DC Level 3 at up to 50.0 kW shared between two active charger heads.

.3 Design Details:

.1 Input Power:

.1 Level 2 AC: 40A, 208V AC, 60 Hz, Single-phase service per charger head.

.2 Level 3 DC: 65A, 480V AC, 60 Hz, Three-phase service per charging unit.

.2 Output Power:

.1 Max Output Power:

.1 Level 2, 7.2kW, 208V AC

.2 Level 3, 50.0kW, 50-500V DC, 0.5-125A DC

.2 Power Sharing:

.1 Control maximum output power to every EV in accordance with the SAE J1772 norm for Level 2, and SAE Combo CCS1 norm for Level 3, in accordance with the following criteria:

.1 Output current: adjustable from 6A to 30A for Level 2, and adjustable from 0.5A DC to 125A DC for Level 3.

.2 Control Resolution: Plus/Minus 1A or better

.3 Fail-Safe Mode: Protect electrical infrastructure if communication is down between the site controller and the charging station by lowering output current to 8A.

.3 Power Management:

.1 Manage charging current to each of the chargers automatically in real time to do the following:

.1 Optimally share the available maximum current among the charging stations on the site

.2 Limit the total amount of current used by the charger to any one of the following:

.1 Set value.

.2 Schedule of set points over the period of 24 hours

.3 Dynamic set point that is updated every minute by an existing energy management system for the entire building.

.4 Integral GFCI

.1 Unit shall be complete with built-in 20mA ground fault protection,

.2 GFCI shall automatically retry every 15 minutes up to three times.

.4 Enclosures:

.1 Certified EEMCA 3R

.2 Comprised of metal capable of providing equivalent robustness and protection against corrosion, harsh weather, and vandalism.

.3 Enclosure rated for indoor and outdoor installation.

.4 Dedicated surface area on enclosure to allow the site owner to add custom branding.

.5 EV Cable and Connectors

.1 SAE J1772 Connector for Level 2

.2 SAE CCS Combo 1 and CHAdeMO Standard Connectors for Level 3

.3 Connector shall be equipped with an anchoring eyelet to allow locking the connector to the holster or the vehicle.

.4 Connector designed for intensive use.

.5 Minimum cable length of not less than 18 ft. (5.4m)

.6 Cable shall maintain its flexibility over the rated operating temperature range as noted in 2.1.2.1.

.7 Field-replaceable connector and cable assembly.

.6 Cable Management System:

.1 Minimum Range: 18 ft. (5.4m)

.2 Design:

.1 Internal counterweight system.

.2 Steel cord to recall the charging cable.

.3 The system shall be independently serviceable and replaceable without disconnecting the power supply to or at the charging station.

.7 Status Indicators

.1 LEDs to indicate the following states of the charging station using different colors:

.1 Charging station available for use.

.2 Charging station in use/vehicle charging.

.3 Charging station not available because of a fault in the system.

.2 Shall allow a user to identify charging station from a distance by flashing the LED on the charging station using the mobile app.

.8 Display Screen:

.1 Daylight viewable, UV-protected display with human-machine interface capability.

.1 Capable of displaying at least 80 characters.

.2 Easy to read in a cold temperature of minus 40 deg C.

.2 Displays power, charging, charging complete, remote control, system status, faults, and service.

.3 Displays the following information to users (configurable in two languages):

.1 In Waiting Mode: Charging fee and a custom message from the site Owner.

.2 At the Start of the Charging Session: Instructions to start a charging session.

.3 During the Charging Session: Cumulative length of the session.

.4 At the End of the Session: Total length and cost for the charging session.

.9 Building Management System Integration:

.1 Site Controller Interface: BACnet IP interface, to allow integration with an existing energy management system including transfer of the following data quantities:

.1 Allow the energy management system to assign the controller a set point change of maximum output current updated every minute.

.2 Allow the transfer of the maximum aggregated current allowed to every charging EV, if there is no restriction, updated every minute.

.3 Inform the energy management system of the total amount of aggregated current for every EV, in real time, updated every minute.

.10 Networking:

.1 WAN Communications: Wired LAN.

.2 LAN Communications: Zigbee - IEEE 802.15.4 meshed network.

.3 Network Control: Charging station must allow the following functions to be performed remotely, subject to availability of cellular service:

.1 Customize the charging station pricing policy and rates.

.2 Activate or deactivate the charging station.

.3 Start or stop a charging session.

.4 Set or modify maximum output current.

.5 Update the embedded software and firmware of the charger.

.6 Provide real-time health status of EVSE back to the network monitoring system.

2.2 WARRANTY

.1 The Supplier shall guarantee the EVSE's to be free from defects, for a period of five (5) years after final commissioning of the EVSE. The Supplier shall make good all defects, other than normal wear and tear, during the life of the guarantee.

.2 Guarantees shall be submitted in writing and submitted to the Engineer for review. Each guarantee shall include:

.1 Project name and address.

.2 Guarantee time period (commencement date shall be the date of final commissioning of the EVSE, unless otherwise indicated).

.3 Clear and concise definition of what is guaranteed.

.4 Signatures of company officers of the Supplier and/or manufacturers, as applicable.

2.3 SPECIFIED UNIT

.1 Unit shall be equivalent to:

.1 Level 2: Flo SmartTWO

.2 Level 3: Flo SmartDC

.2 Acceptable Alternate Manufacturers provided they can comply:

.1 ABB

.2 Chargepoint

.3 Siemens

.4 Leviton

.5 Enel-X

Part 3 Execution

3.1 SUPPLY AND DELIVERY

.1 The Supplier shall supply and deliver the EVSE's and accessories under this Contract to the Owner's site(s). Delivery is to be coordinated with the Owner's installation Contractor.

3.2 INSTALLATION

.1 The Supplier of the above EVSE's set shall supervise and check out the installation and be present at the startup, functional testing and commissioning of the unit.

3.3 CYBERSECURITY

.1 Software – the Supplier shall:

.1 Coordinate security requirements with Owner's IT department.

.2 Ensure that latest stable software release is installed and properly operating.

.3 Disable or change default passwords to password of at least eight characters in length, using a combination of uppercase and lower letters, numbers, and symbols. Record passwords and turn over to party responsible for system operation and administration.

.2 Hardware:

.1 Coordinate location and access requirements with Owner's IT department.

.2 Enable highest level of wireless encryption that is compatible with Owner's ICT network.

.3 Disable dual network connections.

3.4 FIELD QUALITY CONTROL

.1 Retain "Manufacturer's Field Service" Paragraph below to require a factory authorized service representative to perform tests and inspections.

.2 Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

.3 Retain "Perform tests and inspections" Paragraph below to require the Supplier to perform tests and inspections and retain option to require the Supplier to arrange for assistance of a factory-authorized service agent.

.4 Perform tests and inspections with the assistance of a factory-authorized service representative.

3.5 ACCEPTANCE TEST AND INSPECTIONS

.1 For each unit of EVSE, perform the following acceptance tests and inspections:

.1 Unit self-test.

.2 Operation test with load bank.

.3 Operation test with EV.

.4 Network communications test.

.2 EVSE will be considered defective if it does not pass tests and inspections.

.3 Prepare test and inspection reports.

3.6 STARTUP SERVICE

.1 Engage a factory-authorized service representative to perform startup service.

.2 Complete installation and startup check in accordance with manufacturer's written instructions.

3.7 SOFTWARE SERVICE AGREEMENT

.1 Services in this article may not be allowed for publicly funded projects.

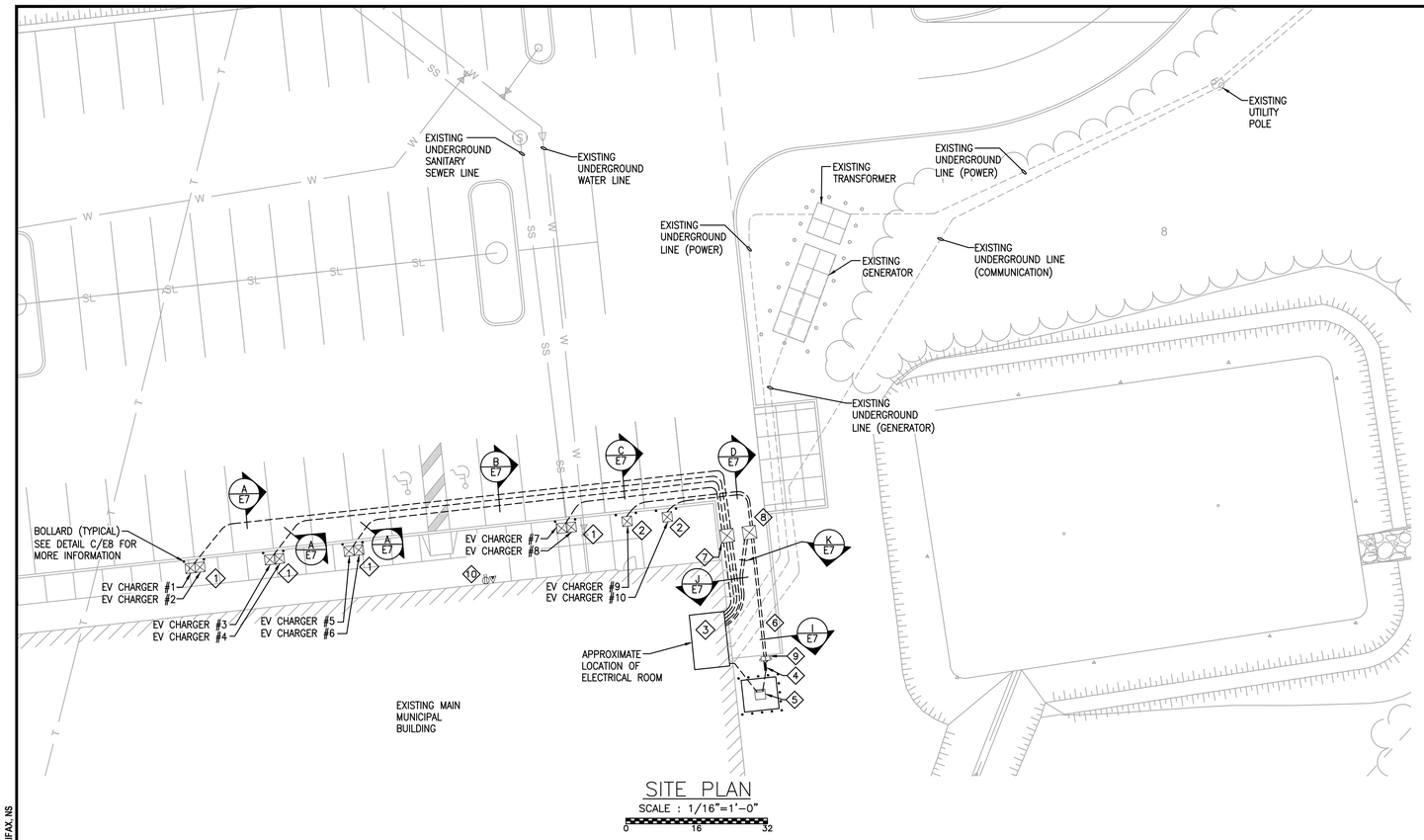
.2 Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

.3 Upgrade Service: At Substantial Completion, update software to latest version.

.4 Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

.5 Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

END OF SECTION



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32

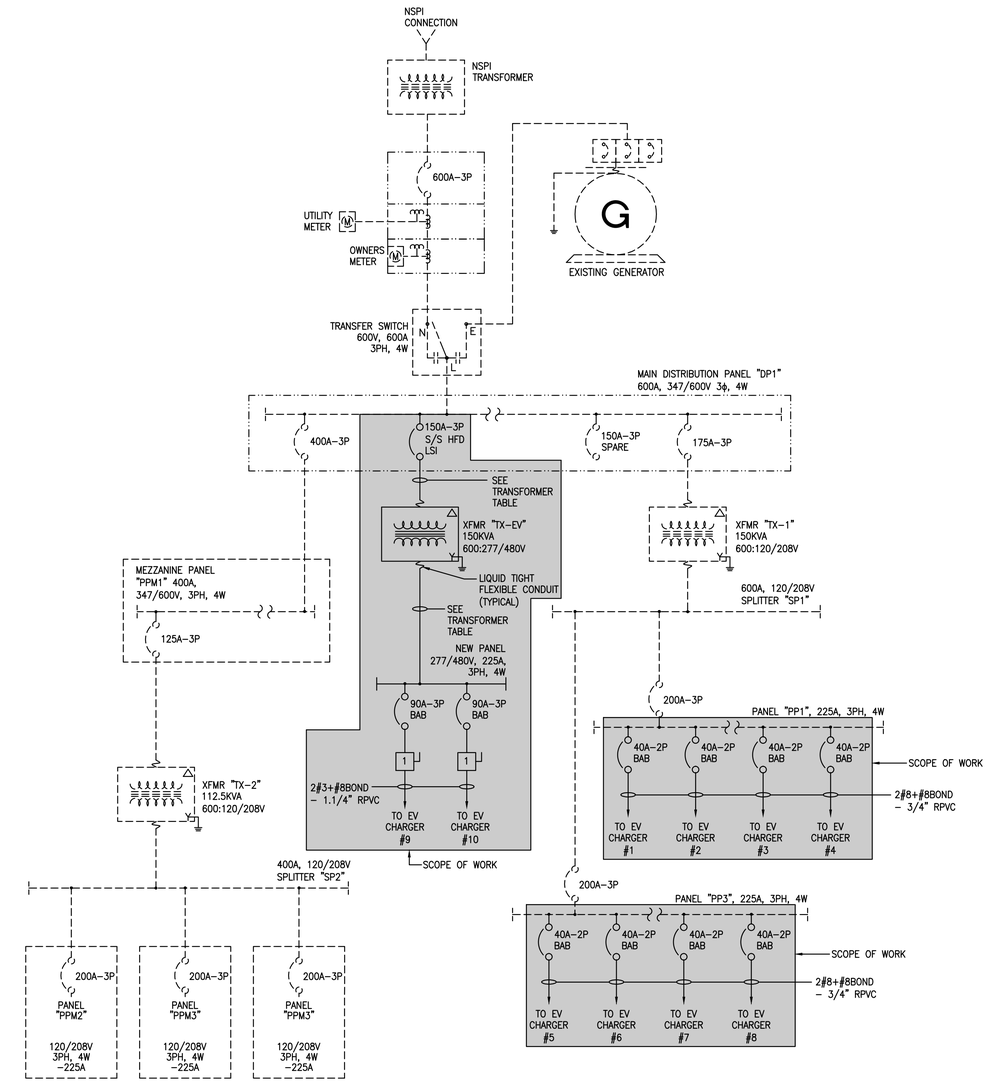
BREAKER DEFINITIONS

PROVIDE BREAKERS AS INDICATED, FRAME TYPES REFERENCED ARE EATON / CUTLER HAMMER:

- 200A–3P — TRIP UNIT SIZE AND/OR TRIP UNIT SETTING
- 100% — 100% RATING FOR BREAKER
- LG S/S — FRAME SIZE AND TRIP UNIT (S/S: SOLID STATE, TM: THERMAL MAGNETIC)
- LSIG — TRIP UNIT CHARACTERISTICS (INDEPENDENTLY ADJUSTABLE LONG TIME PICKUP/DELAY, SHORT TIME PICKUP/DELAY, INSTANTANEOUS AND GROUND FAULT PICKUP/DELAY) STANDARD OF ACCEPTANCE: EATON DIGITRIP 310+
- ST — SHUNT TRIP
- ARMS — ARCFLASH REDUCTION MAINTENANCE SWITCH

GENERAL NOTES:

1. SOLID STATE BREAKERS TRIP UNIT SHALL BE SET BEFORE ENERGIZATION BASED ON THE FINDINGS OF THE COORDINATION STUDY



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

ELECTRICAL NOTES:

INDICATED BY THE ⟨1⟩ SYMBOL ON THE DRAWINGS. (I.E. ⟨1⟩ INDICATES NOTE 1)

NOTE 1: DUAL HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO–SMARTTWO" SYSTEMS:
- S2–V4–TETE–FL–BLRV CHARGING STATION HEAD (QUANTITY OF 2)
- S2–V2–ACCSPSM–01–03–FL–BCCE SINGLE WHITE SIGN (QUANTITY OF 4)
- S2–V2–ACCSPSM–01–02–GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 2)
- S2–V2–ACCSPSM–01–05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2–V4–SP–RV–GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 2)
- S2–V2–ACCSP–01–03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: DUAL HEAD LEVEL THREE CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM 50kW "FLO–SMARTDC" SYSTEMS:
- DCCH5013AN1–FL–P03

NOTE 3: FEED LEVEL 2 CHARGING STATION UNITS #1 TO #4 FROM EXISTING PANEL "PP1" AND UNITS #5 TO #8 FROM EXISTING PANEL "PP3". PROVIDE FOUR (4) NEW 40A 2 POLE BREAKERS FOR EACH PANEL. BREAKER TYPE TO MATCH EXISTING. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 4: PROVIDE AND INSTALL NEW 277/480V PANEL FED FROM NEW 75KVA STEP DOWN TRANSFORMER. SEE DETAIL E/E8 FOR PANEL MOUNTING DETAILS. FEED THE LEVEL 3 CHARGING STATION UNIT FROM NEW 277/480V. PROVIDE TWO (2) 90A 3 POLE BREAKERS. BREAKER TYPE TO BE BAB. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 5: PROVIDE AND INSTALL A NEW PADMOUNT 75KVA STEP DOWN TRANSFORMER FED FROM NEW 90A, 3 POLE BREAKER IN EXISTING PANEL "DP1". NEW TRANSFORMER TO FEED NEW 277/480V PANEL. CONTRACTOR SHALL PROVIDE AND INSTALL A PRE–CAST CONCRETE PAD SUITABLE FOR A NEW 75KVA PAD MOUNT TRANSFORMER. PAD SHALL BE EQUIVALENT TO SHAW PRECAST SOLUTIONS THREE PHASE PAD MOUNT TRANSFORMER PAD 2400X2200.

NOTE 6: LEVEL 3 EV CONDUIT SHALL CROSS OVER THE EXISTING INCOMING POWER AND COMMUNICATION SERVICES. PROVIDE A PRESSURE TREATED PLANK AND MARKER TAPE BETWEEN THE LEVEL 3 EV DUCT BANK AND INCOMING SERVICES DUCT BANKS.

NOTE 7: PULL BOX FOR LEVEL 2 EV CHARGERS.

NOTE 8: PULL BOX FOR LEVEL 3 EV CHARGER.

NOTE 9: PROVIDE AND INSTALL NEW TYPE 1 DISCONNECT SWITCH FED FROM NEW 277/480V PANEL. SEE DETAIL E/E8 FOR DISCONNECT MOUNTING DETAILS.

NOTE 10: ONE 15A DUPLEX U–GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. THE CONTRACTOR SHALL COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.
2. THE CONTRACTOR SHALL HAVE A SITE SERVICES LOCATION PLAN COMPLETED TO IDENTIFY EXISTING UNDERGROUND SERVICES. ANY EXISTING SERVICES SHOWN ON PLANS ARE FOR REFERENCE ONLY.

TRANSFORMER TABLE

TRANSFORMER	SIZE	K–VALUE	NEMA	PRIMARY FEEDER	SECONDARY FEEDER	BONDING JUMPER	DIMENSIONS
TX–EV	150 KVA	K13	4X	3#1/0AWG+#6BOND–1.1/2"C	TWO PARALLEL RUNS OF 5#300MCM+#4BOND–3"C	#1AWG CU	28"W x 26.72"D x 37"H

TRANSFORMER NOTES:

1. TRANSFORMER SHALL BE 600V DELTA TO 277/480V WYE GROUND UNLESS NOTED OTHERWISE.
2. TRANSFORMER SHALL HAVE A % IMPEDANCE NOT LESS THAN 3% AND A SOUND RATING NOT GREATER THAN 55dB UNLESS NOTED OTHERWISE.
3. SYSTEM BONDING JUMPER SHALL BE COPPER.
4. WHERE INDICATED, DIMENSIONS ARE BASED ON DELTA TRANSFORMERS. THE ELECTRICAL CONTRACTOR SHALL CONFIRM ALTERNATE MANUFACTURER TRANSFORMER WILL FIT WITHIN THE ELECTRICAL ROOM.
5. ALL WINDINGS SHALL BE COPPER.

DISCONNECT SWITCH NOTES:

1 — 600V/3P/100 AMPS DISCONNECT SWITCH EQUIVALENT TO CUTLER HAMMER WEATHER PROOF CAT. No. 3HD363NF.

HALIFAX, NS

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

REGISTERED PROFESSIONAL ENGINEER — DATE: 2024-02-28 — M.A. Islam — 12348 — PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	ISSUED FOR TENDER	2024-02-28	SL
1	ISSUED FOR 90% REVIEW	2024-02-14	SL
0	ISSUED FOR 70% REVIEW	2023-04-14	SL

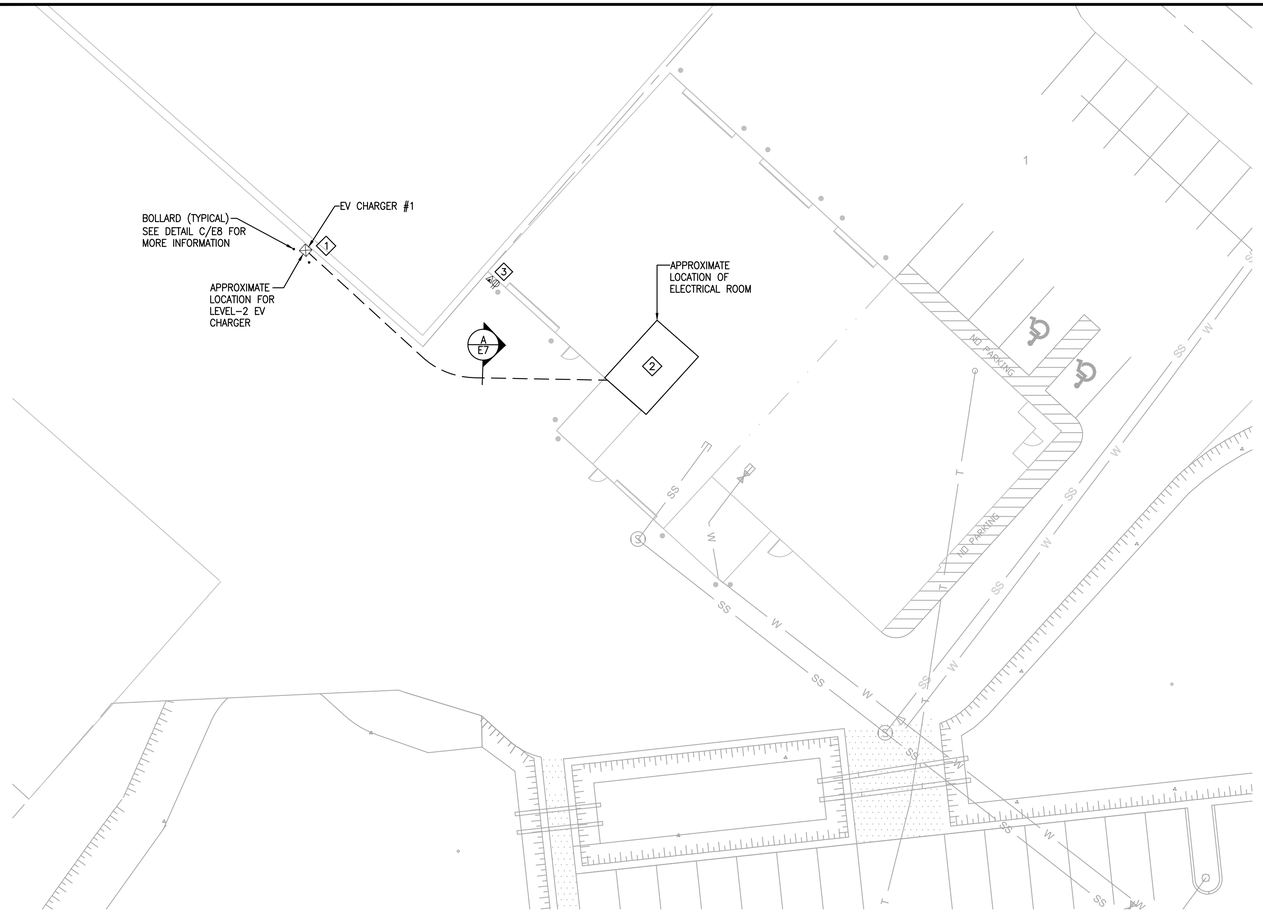
DESIGN: AI — REVIEWED BY: BD
DRAWN: SL — CHECKED BY: AI
DATE: FEBRUARY 2024
SCALE: AS NOTED

ELECTRICAL VEHICLE CHARGING STATION DESIGN

PROJECT NO. 22-4817

SITE LAYOUT - MUNICIPAL MAIN BUILDING
181 COLDBROOK VILLAGE DRIVE

SHEET NO. E1



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32

HALIFAX, NS

ELECTRICAL NOTES:

INDICATED BY THE ⟨1⟩ SYMBOL ON THE DRAWINGS. (I.E. ⟨1⟩ INDICATES NOTE 1)

NOTE 1: SINGLE HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO-SMARTTWO" SYSTEMS:

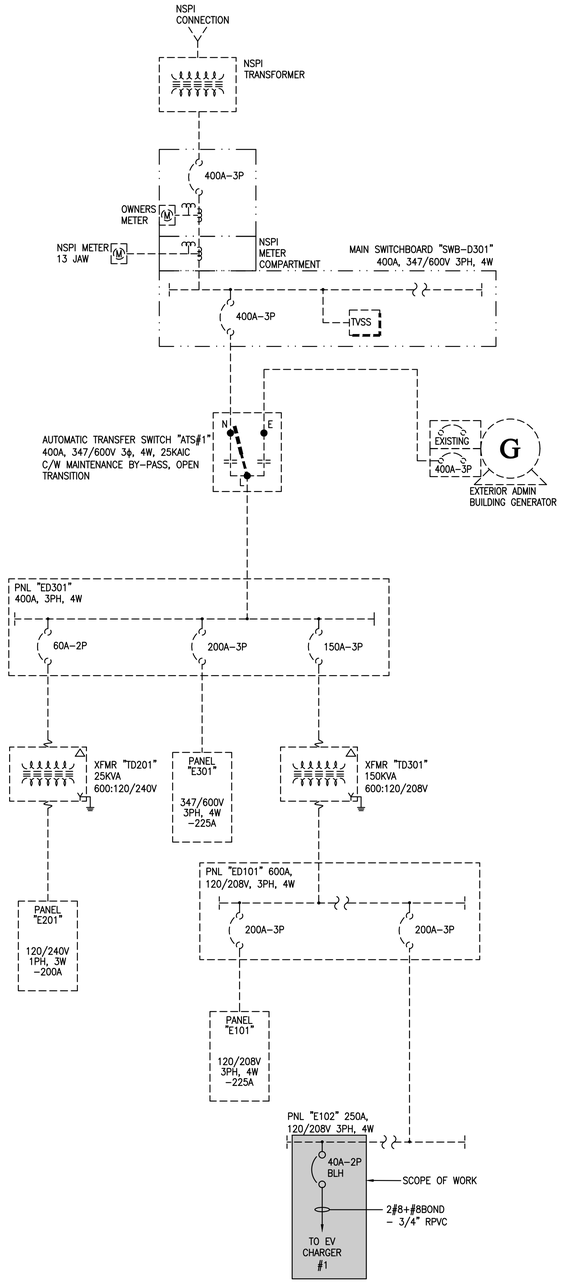
- S2-V4-TETE-FL-BLRV CHARGING STATION HEAD (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-03-FL-BCCE SINGLE WHITE SIGN (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-02-GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2-V4-SP-RV-GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 1)
- S2-V2-ACCSP-01-03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: FEED LEVEL 2 CHARGING STATION UNIT FROM EXISTING PANEL "E102", PROVIDE ONE (1) NEW 40A 2 POLE BREAKER. BREAKER TYPE TO MATCH EXISTING. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB, CONTRACTOR TO STUB OUT AND CAP OFF ONE (1) OF THE NEW CONDUITS, COMPLETE WITH PULL STRING, FOR FUTURE USE. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 3: ONE 15A DUPLEX U-GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

REGISTERED PROFESSIONAL ENGINEER
Date: 2024-02-28
M.A. Islam
12348
PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	ISSUED FOR TENDER	2024-02-28	SL
1	ISSUED FOR 90% REVIEW	2024-02-14	SL
0	ISSUED FOR 70% REVIEW	2023-04-14	SL

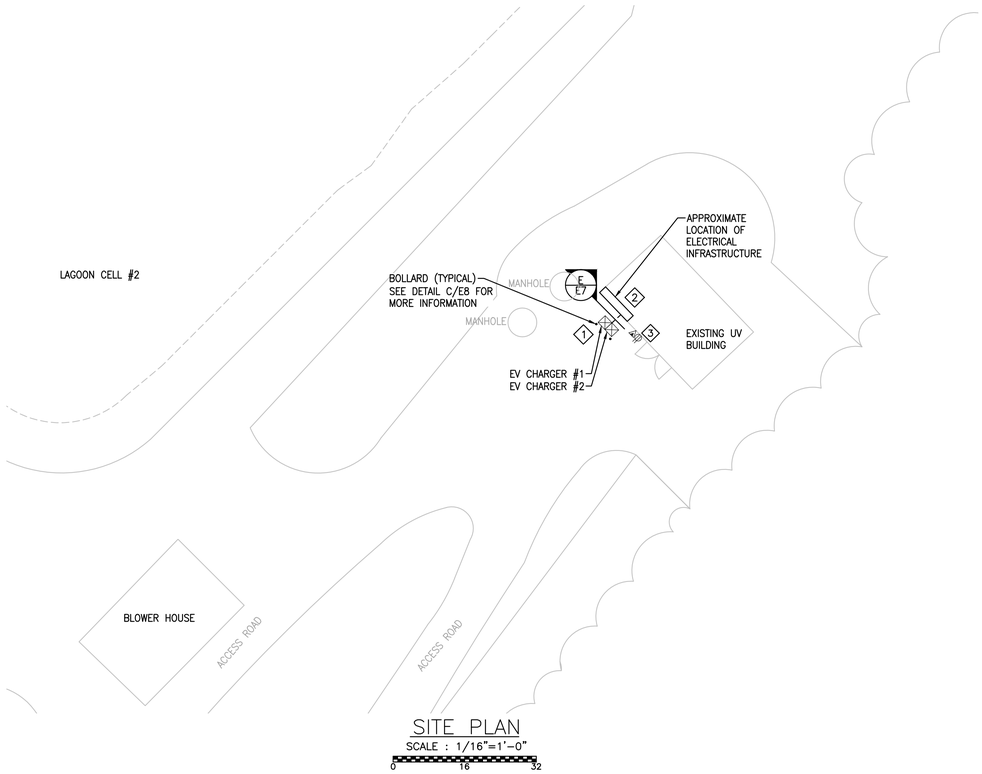
DESIGN: AI	REVIEWED BY: BD
DRAWN: SL	CHECKED BY: AI
DATE: FEBRUARY 2024	
SCALE: AS NOTED	

ELECTRICAL VEHICLE CHARGING STATION DESIGN

SITE LAYOUT - MUNICIPAL OPERATIONS BUILDING
67 COLDBROOK VILLAGE DRIVE

PROJECT NO. 22-4817

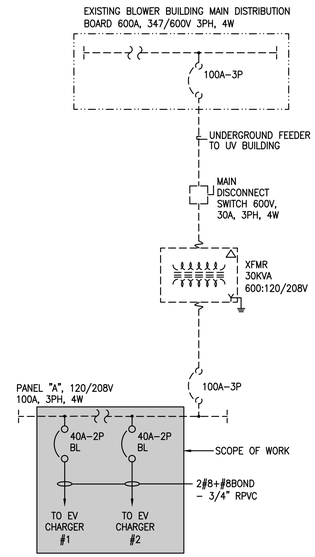
SHEET NO. **E2**



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

ELECTRICAL NOTES:

INDICATED BY THE 1 SYMBOL ON THE DRAWINGS. (I.E. 1 INDICATES NOTE 1)

NOTE 1: DUAL HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO-SMARTTWO" SYSTEMS:
- S2-V4-TETE-FL-BLRV CHARGING STATION HEAD (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-03-FL-BCCE SINGLE WHITE SIGN (QUANTITY OF 4)
- S2-V2-ACCSPSM-01-02-GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2-V4-SP-RV-GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 2)
- S2-V2-ACCSP-01-03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: FEED LEVEL 2 CHARGING STATION UNITS FROM EXISTING PANEL "A". PROVIDE TWO (2) NEW 40A 2 POLE BREAKERS. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 3: ONE 15A DUPLEX U-GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.

HALIFAX, NS

REGISTERED PROFESSIONAL ENGINEER
Date 2024-02-28
M.A. Islam
12348
PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	ISSUED FOR TENDER	2024-02-28	SL
1	ISSUED FOR 90% REVIEW	2024-02-14	SL
0	ISSUED FOR 70% REVIEW	2023-04-14	SL

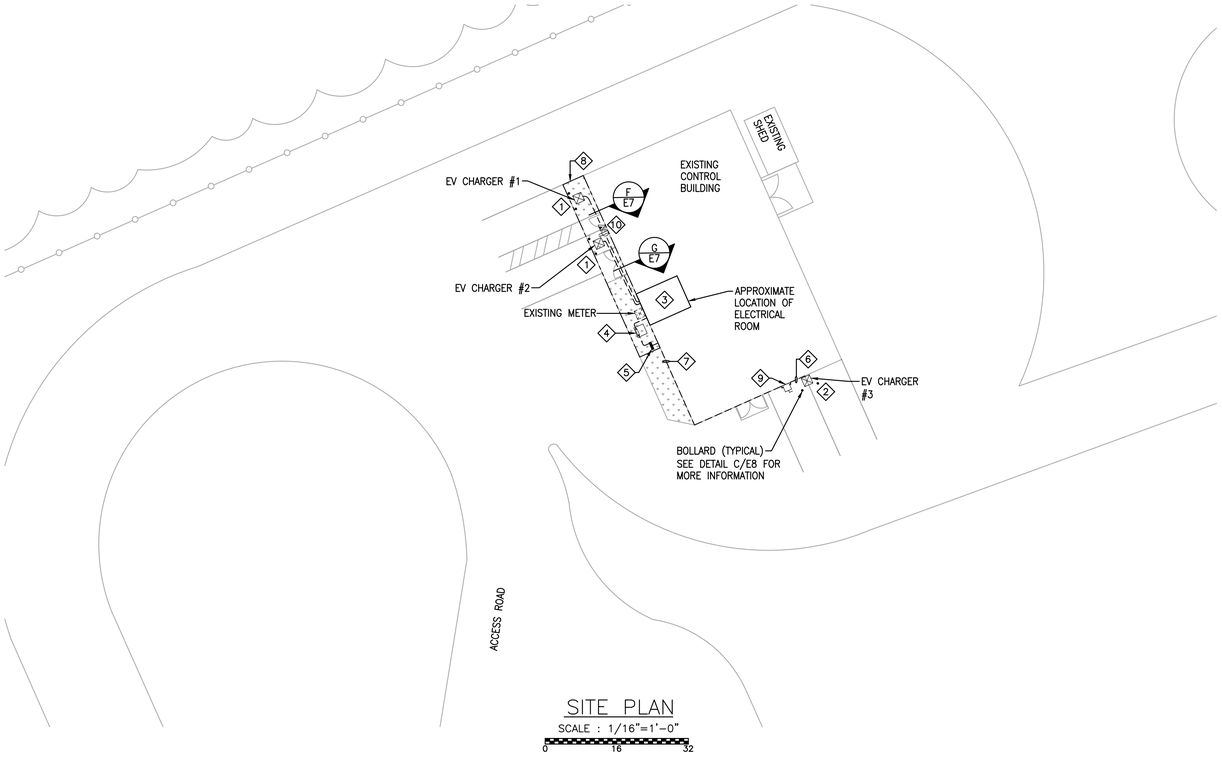
DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	AS NOTED

ELECTRICAL VEHICLE CHARGING STATION DESIGN

SITE LAYOUT - HANTS BORDER STP
208 AVON STREET, HANTSPORT

PROJECT NO. 22-4817

SHEET NO. **E3**



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32

ELECTRICAL NOTES:

INDICATED BY THE ⟨1⟩ SYMBOL ON THE DRAWINGS. (I.E. ⟨1⟩ INDICATES NOTE 1)

NOTE 1: SINGLE HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO-SMARTTWO" SYSTEMS:
- S2-V4-TETE-FL-BLRV CHARGING STATION HEAD (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-03-FL-BCCE SINGLE WHITE SIGN (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-02-GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2-V4-SP-RV-GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 1)
- S2-V2-ACCSP-01-03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: SINGLE HEAD LEVEL THREE CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM 50kW "FLO-SMARTDC" SYSTEMS:
- DCCH501AN1-FL-P03

NOTE 3: FEED EACH LEVEL 2 CHARGING STATION UNIT FROM THE EXISTING PANEL. PROVIDE TWO (2) NEW 40A 2 POLE BREAKERS. BREAKER TYPE TO MATCH EXISTING. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 4: PROVIDE AND INSTALL NEW 75KVA STEP DOWN TRANSFORMER FED FROM EXISTING MAIN DISTRIBUTION PANEL TO FEED A NEW 277/480V PANEL. PROVIDE NEW 80A 3 POLE BREAKER IN MAIN DISTRIBUTION PANEL, BREAKER TYPE TO MATCH EXISTING.

NOTE 5: PROVIDE AND INSTALL NEW 277/480V PANEL FED FROM NEW 75KVA STEP DOWN TRANSFORMER. SEE DETAIL D/E8 FOR PANEL MOUNTING DETAILS. FEED THE LEVEL 3 CHARGING STATION UNIT FROM NEW 277/480V. PROVIDE TWO (2) 90A 3 POLE BREAKERS. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 6: ROUTE ONE X 1.1/4" CONDUIT (POWER) AND ONE X 1" CONDUIT (SPARE) UP ALONG BUILDING EXTERIOR. ROUTE 1.1/4" POWER CONDUIT TO WALL MOUNTED EXTERIOR DISCONNECT SWITCH. ROUTE 1" SPARE CONDUIT ALONG BUILDING INTO ELECTRICAL ROOM TO EXISTING COMMUNICATIONS LOCATION.

NOTE 7: ROUTE 1.1/4" CONDUIT DOWN ALONG BUILDING EXTERIOR TO EXTERIOR MOUNTED 480V PANEL.

NOTE 8: EXTENDED CONCRETE PATH TO ACCOMMODATE NEW LEVEL 2 EV CHARGERS, TRANSFORMER, AND PANEL. CONTRACTOR TO COORDINATE WITH OWNER.

NOTE 9: PROVIDE AND INSTALL NEW WALL MOUNTED TYPE 1 DISCONNECT SWITCH FED FROM NEW 277/480V PANEL.

NOTE 10: ONE 15A DUPLEX U-GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.

TRANSFORMER TABLE

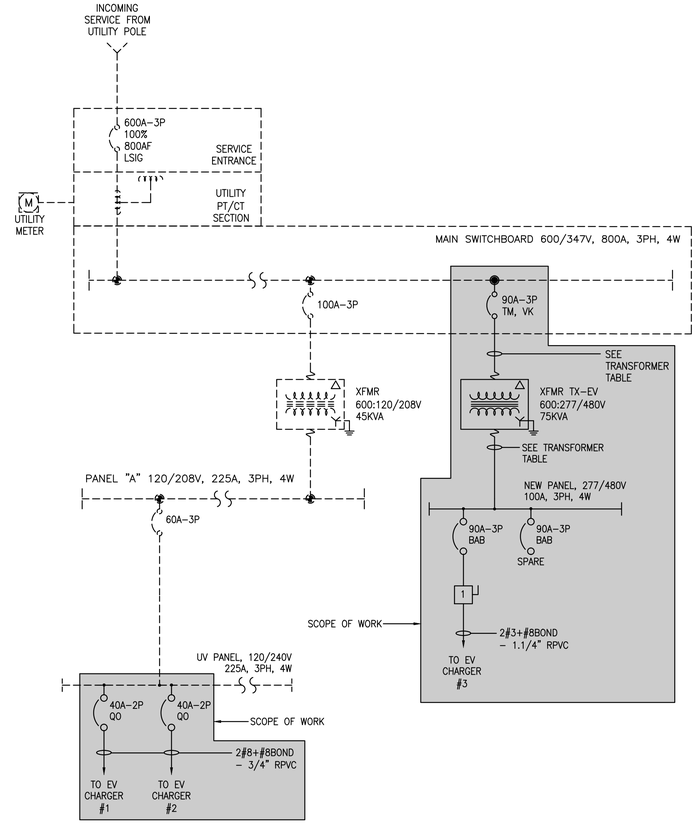
TRANSFORMER	SIZE	K-VALUE	NEMA	PRIMARY FEEDER	SECONDARY FEEDER	BONDING JUMPER	DIMENSIONS
TX-EV	75 KVA	K13	4X	3#3AWG+#8BOND-1"C	5#250MCM+#4BOND-3"C	#3AWG CU	28"W x 26.72"D x 37"H

TRANSFORMER NOTES:

1. TRANSFORMER SHALL BE 600V DELTA TO 277/480V WYE GROUND UNLESS NOTED OTHERWISE.
2. TRANSFORMER SHALL HAVE A 2% IMPEDANCE NOT LESS THAN 3% AND A SOUND RATING NOT GREATER THAN 55dB UNLESS NOTED OTHERWISE.
3. SYSTEM BONDING JUMPER SHALL BE COPPER.
4. WHERE INDICATED, DIMENSIONS ARE BASED ON DELTA TRANSFORMERS CD6C SERIES. THE ELECTRICAL CONTRACTOR SHALL CONFIRM ALTERNATE MANUFACTURER TRANSFORMER WILL FIT WITHIN THE ELECTRICAL ROOM.
5. ALL WINDINGS SHALL BE COPPER.

DISCONNECT SWITCH NOTES:

[1] 600V/3P/100 AMPS DISCONNECT SWITCH EQUIVALENT TO CUTLER HAMMER WEATHER PROOF CAT. No. 3HD363NF.



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

REGISTERED PROFESSIONAL ENGINEER
Date 2024-02-28
M.A. Islam
12348
PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
3	RE-ISSUED FOR TENDER	2024-04-11	AI
2	ISSUED FOR TENDER	2024-02-28	SL
1	ISSUED FOR 90% REVIEW	2024-02-14	SL
0	ISSUED FOR 70% REVIEW	2023-04-14	SL

DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	AS NOTED

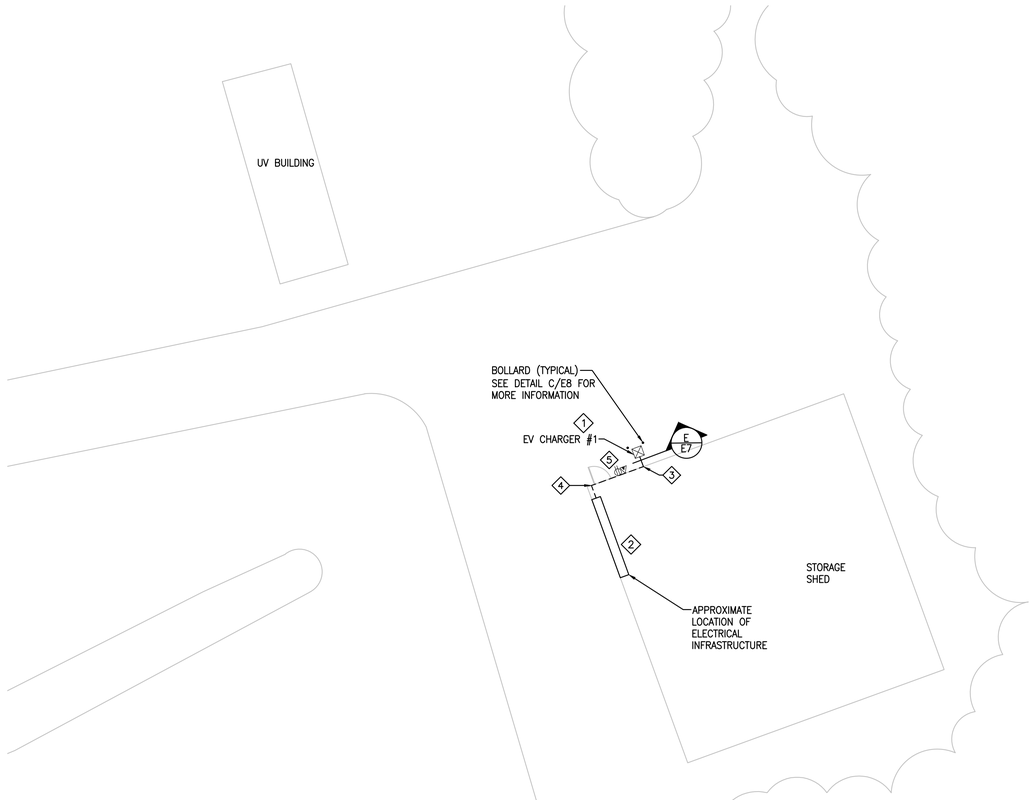
ELECTRICAL VEHICLE CHARGING STATION DESIGN

SITE LAYOUT - GREENWOOD STP
989 MEADOWVALE ROAD

PROJECT NO. 22-4817

SHEET NO. E4

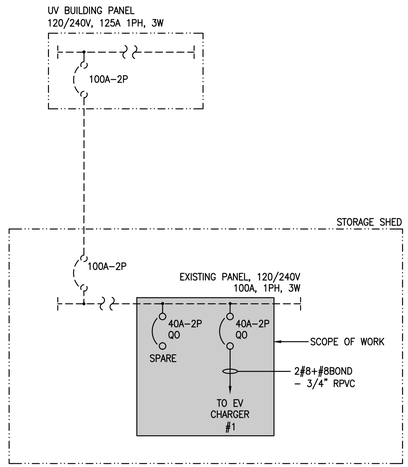
HALIFAX, NS



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

ELECTRICAL NOTES:

INDICATED BY THE (1) SYMBOL ON THE DRAWINGS. (I.E. (1) INDICATES NOTE 1)

NOTE 1: SINGLE HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO-SMARTTWO" SYSTEMS:

- S2-V4-TETE-FL-BLRV CHARGING STATION HEAD (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-03-FL-BCCE SINGLE WHITE SIGN (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-02-GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2-V4-SP-RV-GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 1)
- S2-V2-ACCSP-01-03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: FEED LEVEL 2 CHARGING STATION UNIT FROM EXISTING 120/240V PANEL. PROVIDE TWO (2) NEW 40A 2 POLE BREAKERS. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB, CONTRACTOR TO STUB OUT AND CAP OFF ONE (1) OF THE NEW CONDUITS, COMPLETE WITH PULL STRING, FOR FUTURE USE. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 3: ROUTE CONDUIT UP ALONG BUILDING EXTERIOR TO 8'-0" A.F.F..

NOTE 4: ROUTE CONDUIT THROUGH EXTERIOR WALL INTO BUILDING TO ELECTRICAL EQUIPMENT.

NOTE 5: ONE 15A DUPLEX U-GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.

HALIFAX, NS

REGISTERED PROFESSIONAL ENGINEER
Date: 2024-02-28
M.A. Islam
12348
PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	ISSUED FOR TENDER	2024-02-28	SL
1	ISSUED FOR 90% REVIEW	2024-02-14	SL
0	ISSUED FOR 70% REVIEW	2023-04-14	SL

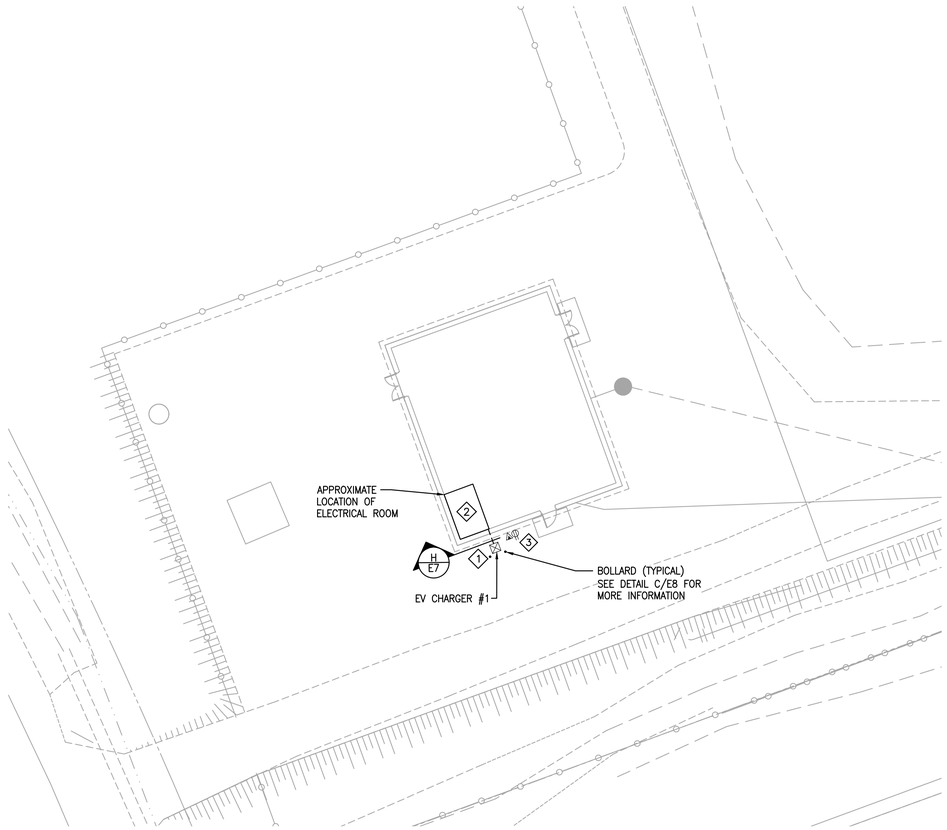
DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	AS NOTED

ELECTRICAL VEHICLE CHARGING STATION DESIGN

SITE LAYOUT - WATERVILLE STP
1307 COUNTY HOME ROAD, KINGS COUNTY

PROJECT NO. 22-4817

SHEET NO. E5



SITE PLAN

SCALE : 1/16"=1'-0"

0 16 32

ELECTRICAL NOTES:

INDICATED BY THE ⟨1⟩ SYMBOL ON THE DRAWINGS. (I.E. ⟨1⟩ INDICATES NOTE 1)

NOTE 1: SINGLE HEAD LEVEL TWO CHARGING STATION SHALL BE EQUAL TO THE FOLLOWING COMPONENTS FROM "FLO-SMARTTWO" SYSTEMS:

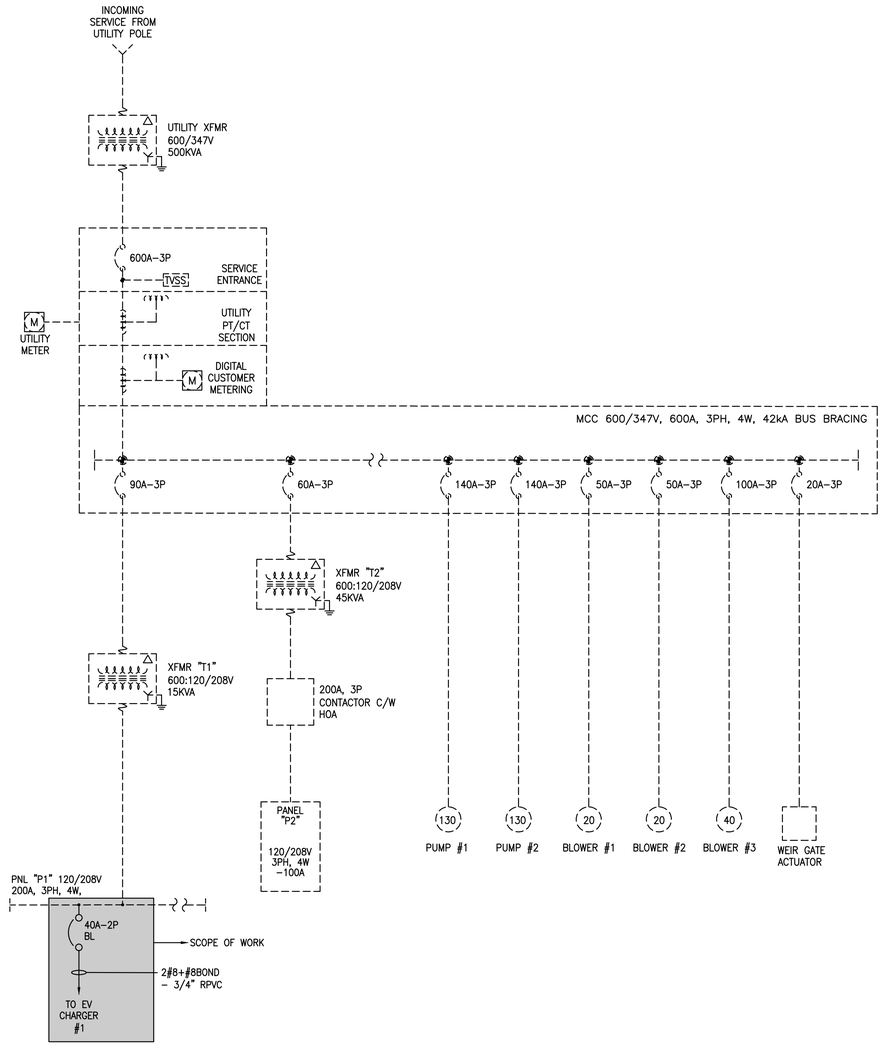
- S2-V4-TETE-FL-BLRV CHARGING STATION HEAD (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-03-FL-BCCE SINGLE WHITE SIGN (QUANTITY OF 2)
- S2-V2-ACCSPSM-01-02-GRRV PEDESTAL MOUNTING BASE (QUANTITY OF 1)
- S2-V2-ACCSPSM-01-05 SPACER KIT FOR DUAL MOUNTING (QUANTITY OF 1)
- S2-V4-SP-RV-GRRV PEDESTAL MOUNTING BASE WITH CABLE HANGER (QUANTITY OF 1)
- S2-V2-ACCSP-01-03 ANCHOR KIT FOR CONCRETE BASE (QUANTITY OF 1)

NOTE 2: FEED THE LEVEL 2 CHARGING STATION UNIT FROM EXISTING PANEL "P1". REPLACE EXISTING SPARE 60A 3 POLE BREAKER WITH ONE (1) NEW 40A 2 POLE BREAKER. CONDUITS TO BE INSTALLED UNDER EXISTING SLAB. COORDINATE FINAL LOCATION WITH OWNER.

NOTE 3: ONE 15A DUPLEX U-GROUND RECEPTACLE FOR POWER AND ONE DUAL DATA DROP FOR COMMUNICATIONS FOR WIRELESS COMMUNICATION GATEWAY MODULE. CONTRACTOR TO COORDINATE WITH MANUFACTURER TO DETERMINE THE COMMUNICATION REQUIREMENT AND ALLOW FOR SUITABLE MEANS OF COMMUNICATION FOR THE GATEWAY/HUB. COORDINATE FINAL LOCATION AND MANUFACTURER REQUIREMENTS WITH OWNER PRIOR TO INSTALLING.

GENERAL NOTES:

1. COORDINATE NEW UNDERGROUND SERVICES WITH EXISTING UNDERGROUND SERVICES. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE EXISTING EMERGENCY SERVICES RUNNING UNDER FACILITY ARE UNINTERRUPTED. CONTRACTOR TO OBTAIN PRIVATE LOCATES FOR ALL EXCAVATION AREAS.



PARTIAL SINGLE LINE DIAGRAM

SCALE : N.T.S.

REGISTERED PROFESSIONAL ENGINEER
2024-02-28
M.A. Islam
12348
PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

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DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	AS NOTED

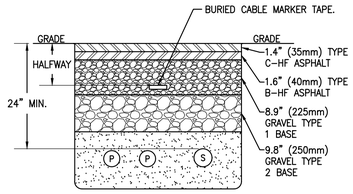
ELECTRICAL VEHICLE CHARGING STATION DESIGN

SITE LAYOUT - ALDERSHOT STP
700 NS-341 (HIGHWAY 341), UPPER DYKE

PROJECT NO. 22-4817

SHEET NO. **E6**

HALIFAX, NS

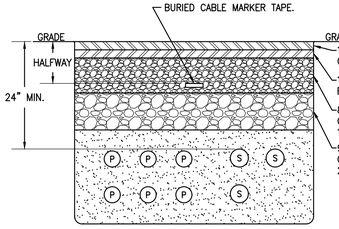


TWO X 3/4" RIGID PVC FOR POWER (P). ONE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – TYPICAL DUAL LEVEL 2 EV TRENCH WITH ASPHALT PAVING — A / E7

SCALE : N.T.S.

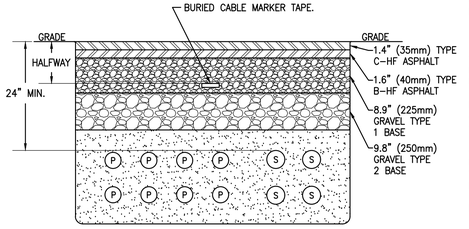


SIX X 3/4" RIGID PVC FOR POWER (P). THREE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – EV TRENCH WITH ASPHALT PAVING — B / E7

SCALE : N.T.S.

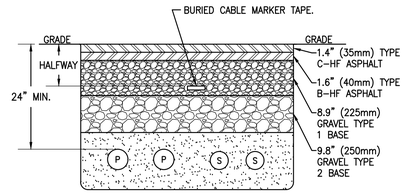


EIGHT X 3/4" RIGID PVC FOR POWER (P). FOUR X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – EV TRENCH WITH ASPHALT PAVING — C / E7

SCALE : N.T.S.

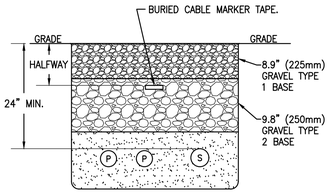


TWO X 1.1/4" RIGID PVC FOR POWER (P). TWO X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – TYPICAL LEVEL 3 EV TRENCH WITH ASPHALT PAVING — D / E7

SCALE : N.T.S.

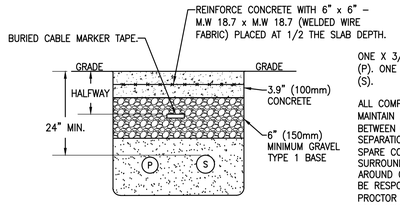


TWO X 3/4" RIGID PVC FOR POWER (P). ONE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM.)

DETAIL – TYPICAL DUAL LEVEL 2 EV TRENCH — E / E7

SCALE : N.T.S.

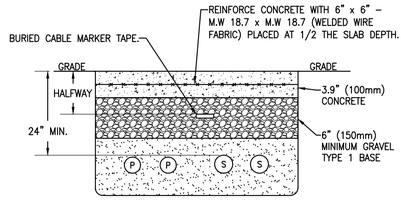


ONE X 3/4" RIGID PVC FOR POWER (P). ONE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AT 100% MINIMUM.)

DETAIL – TYPICAL SINGLE LEVEL 2 EV TRENCH WITH CONCRETE SIDEWALK — F / E7

SCALE : N.T.S.

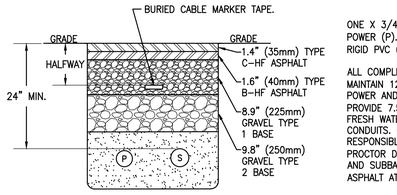


TWO X 3/4" RIGID PVC FOR POWER (P). ONE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AT 100% MINIMUM.)

DETAIL – TWO SINGLE LEVEL 2 EV TRENCH WITH CONCRETE SIDEWALK — G / E7

SCALE : N.T.S.

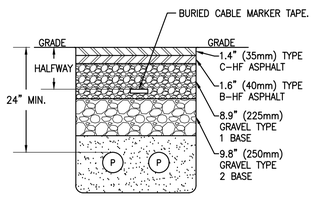


ONE X 3/4" RIGID PVC FOR POWER (P). ONE X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – TYPICAL SINGLE LEVEL 2 EV TRENCH WITH ASPHALT PAVING — H / E7

SCALE : N.T.S.

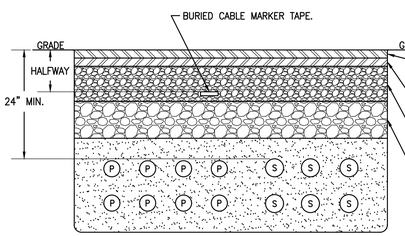


TWO X 1.1/4" RIGID PVC FOR POWER (P).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – TWO LEVEL 3 EV TRENCH WITH ASPHALT PAVING — I / E7

SCALE : N.T.S.

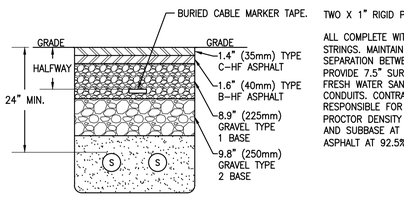


EIGHT X 3/4" RIGID PVC FOR POWER (P). SIX X 1" SPARE RIGID PVC (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS AND 12" SEPARATION BETWEEN POWER AND SPARE CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – EV TRENCH WITH ASPHALT PAVING — J / E7

SCALE : N.T.S.



TWO X 1" RIGID PVC SPARES (S).

ALL COMPLETE WITH PULL STRINGS. MAINTAIN 7.5" MINIMUM SEPARATION BETWEEN CONDUITS. PROVIDE 7.5" SURROUND OF FRESH WATER SAND AROUND CONDUITS. CONTRACTOR TO BE RESPONSIBLE FOR STANDARD PROCTOR DENSITY TESTING (BASE AND SUBBASE AT 100% MINIMUM. ASPHALT AT 92.5% MINIMUM.)

DETAIL – TWO SPARES WITH ASPHALT PAVING — K / E7

SCALE : N.T.S.

HALIFAX, NS

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

REGISTERED PROFESSIONAL ENGINEER — Date: 2024-02-28 — M. A. Islam — 12348 — PROVINCE OF NOVA SCOTIA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	ISSUED FOR TENDER	2024-02-28	SL
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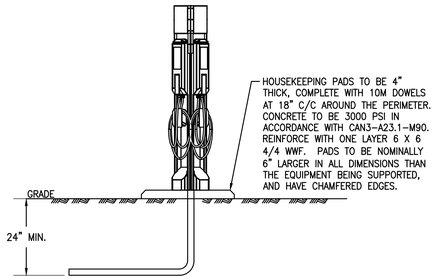
DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	NOT TO SCALE

ELECTRICAL VEHICLE CHARGING STATION DESIGN

ELECTRICAL DETAILS

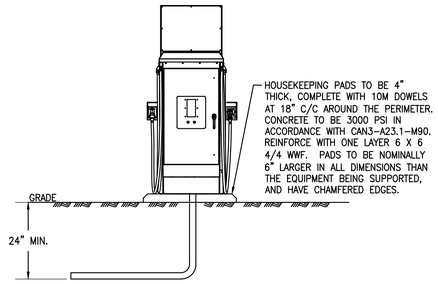
PROJECT NO. 22-4817

SHEET NO. **E7**



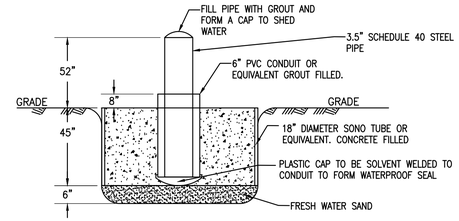
DETAIL – TYPICAL LEVEL 2 EV PEDESTAL MOUNTING — A / E8

SCALE : N.T.S.



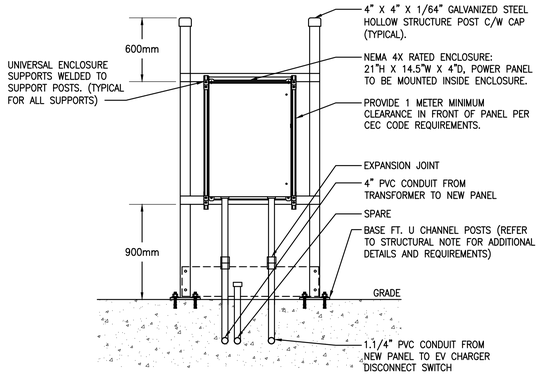
DETAIL – TYPICAL LEVEL 3 EV PEDESTAL MOUNTING — B / E8

SCALE : N.T.S.



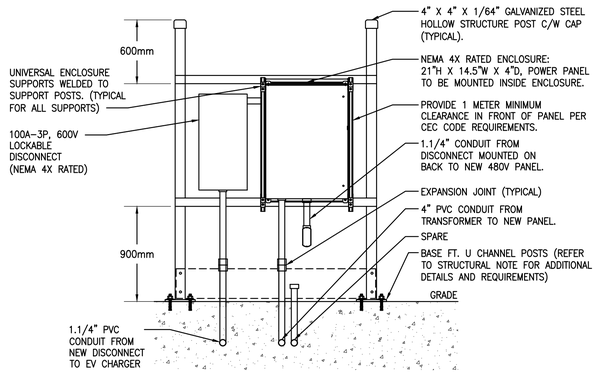
DETAIL – TYPICAL BOLLARD — C / E8

SCALE : N.T.S.

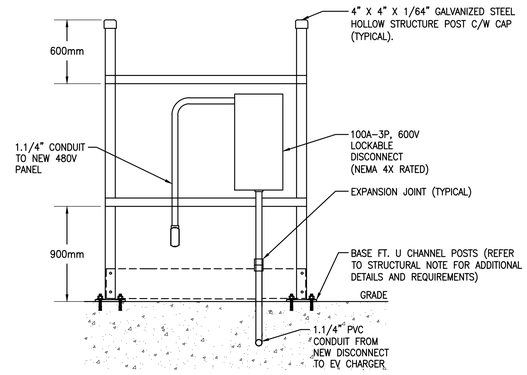


DETAIL – EXTERIOR MOUNTED PANEL — D / E8

SCALE : N.T.S.



FRONT



BACK

DETAIL – EXTERIOR MOUNTED PANEL AND DISCONNECT SWITCH — E / E8

SCALE : N.T.S.

HALIFAX, NS

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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REGISTERED PROFESSIONAL ENGINEER — Date: 2024-02-28 — M.A. Islam — 12348 — PROVINCE OF NOVA SCOTIA

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DESIGN	AI
REVIEWED BY	BD
DRAWN	SL
CHECKED BY	AI
DATE	FEBRUARY 2024
SCALE	NOT TO SCALE

ELECTRICAL VEHICLE CHARGING STATION DESIGN

ELECTRICAL DETAILS

PROJECT NO. **22-4817**

SHEET NO. **E8**