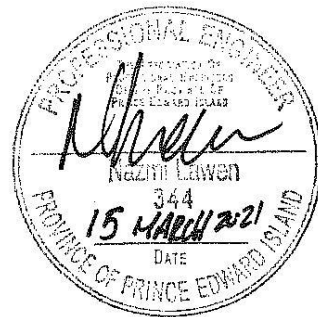
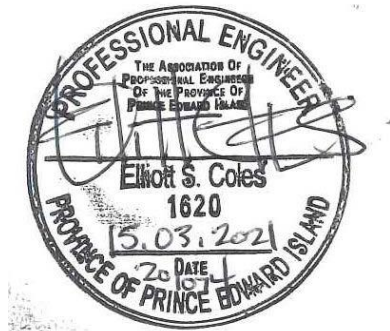


SPECIFICATIONS

CABOT BEACH PROVINCIAL PARK 3 WAY SITE EXPANSION MALPEQUE, PEI



Consultant:
Coles Associates Ltd.

Project #201074

March 15, 2021

TABLE OF CONTENTS

	Pages
Division 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS	
Section 00 01 15 - List of Drawing Sheets	1
Section 00 21 13 - Instructions to Bidders	10
Section 00 41 13 - Bid Form	7
Section 00 52 13 - Agreement Form - Stipulated Sum	1
Section 00 73 00 - Supplementary Conditions	6
Division 01 - GENERAL REQUIREMENTS	
Section 01 10 00 - Summary	4
Section 01 29 00 - Payment Procedures	2
Section 01 29 83 - Payment Procedures for Testing Laboratory Services	2
Section 01 32 00 - Prosecution and Progress	2
Section 01 33 00 - Submittal Procedures	4
Section 01 35 29 - Health, Safety and Emergency Response Procedures	12
Section 01 35 43 - Environmental Procedures	1
Section 01 50 00.01 - Temporary Facilities and Controls	1
Section 01 51 00 - Temporary Utilities	1
Section 01 77 00 - Closeout Procedures	4
Section 01 78 00 - Closeout Submittals	6
Division 26 - ELECTRICAL	
Section 26 05 00 - Common Work Results - Electrical	6
Section 26 05 03 - Electrical Removals and Alterations	2

Section 26 05 20 - Wire and Box Connectors (0 - 1000V)	1
Section 26 05 21 - Wires and Cables (0 - 1000V)	2
Section 26 05 27 - Grounding - Primary	2
Section 26 05 28 - Grounding - Secondary	2
Section 26 05 29 - Hangers and Supports for Electrical Systems	1
Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings	2
Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts	3
Section 26 24 16.01 - Panelboards Breaker Type	2
Section 26 27 26 - Wiring Devices	2
Section 26 28 16.02 - Moulded Case Circuit Breakers	2

Division 31 - EARTHWORK

Section 31 10 00 - Erosion Control	2
Section 31 23 00 - Excavation and Fill	9

Division 32 - EXTERIOR IMPROVEMENTS

Section 32 91 19.13 - Topsoil Placement and Grading	3
Section 32 92 19.02 - Hydraulic Seeding	4

Division 33 - UTILITIES

Section 33 05 13 - Manholes and Structures	3
Section 33 11 13 - Public Water Utility Distribution Piping	5
Section 33 31 13 - Public Sanitary Utility Sewerage Piping	5
Section 33 65 76 - Direct Buried Underground Cable Ducts	2

1 General

1.1 LIST OF DRAWINGS

.1	C1	Site Plan and Servicing
.2	C2	Site Details
.3	C3	Site Plan and Sections, Existing Lagoon Expansion
.4	E100	Electrical Site Plan, Trench Details, Legend & Notes
.5	E101	Details
.6	E102	Schematic Details

END OF SECTION

1 General

1.1 SUMMARY OF WORK

- .1 The work of this contract involves all the work relating to the supply and installation of all plant, material and labour required to develop additional 3-way RV future campsites and expand existing sewage lagoon, as shown on the Drawings and contained within these Specifications, including all civil, mechanical and electrical work, comprising but not limited to:
 - .1 Clearing and grubbing;
 - .2 Excavation, backfilling, compacting and provision of select borrow, Class A gravel, bedding sand, topsoil etc;
 - .3 Construction of service roads and campsites;
 - .4 Construction of water supply piping and appurtenances;
 - .5 Construction of sanitary sewer piping, manholes and associated components;
 - .6 Provision for a sanitary lift station, complete with duplex pumps and controls;
 - .7 Expansion of existing lagoon;
 - .8 Electrical:
 - .1 Supply and installation of new underground primary and secondary conduit, and installation of new transformer pads and grounding.
 - .2 Supply and installation of all secondary distribution equipment including conductor, panelboards, wiring devices, etc. for a fully operational system as described.
 - .3 The local electrical utility (MECL) will be responsible for all high voltage work associated with this project, including but not limited to the supply, delivery, installation, testing and commissioning of new pad mounted stepdown transformers, 15KV cabling, high voltage terminations, etc. All primary underground conduit, transformer pads, grounding, bollards, etc. to be completed by this Contractor. Contractor is responsible to coordinate the scope of this work with the Utility and Departmental Representative.
 - .9 Connection to existing systems and site services;
- .2 All in accordance with the requirements of the specifications and drawings listed on their respective Index of Specifications and Drawings.
- .3 Refer to Paragraph 1.27 Timing Requirements of this Section, for scheduling of construction activities.

1.2 ENQUIRIES

- .1 Direct all inquiries during the tender period to:

Coles Associates Ltd.
P.O. Box 695
85 Fitzroy Street, Suite 201
Charlottetown, PEI
C1A 1R6

Phone: (902) 368-2300
Email: nlawen@colesassociates.com
CC: tellsworth@colesassociates.com

Attention: Nazmi Lawen, P. Eng.

- .2 All enquiries are to be directed to the Consultant a minimum of three (3) days prior to

tender closing in order to allow the Consultant to issue an addendum a minimum of two (2) days prior to tender close.

1.3 TENDERING PROCEDURE

- .1 General Contractors:
 - .1 Submit their tender for the entire work of this Contract, INCLUDING the work of the Civil, Mechanical and Electrical, directly to the Owner in accordance with the requirements of the Invitation to Tender and this specification.

1.4 SPECIFICATION EXPLANATION

- .1 Whenever the words "as shown," "as noted," "as called for," "indicated," or similar phrases are used, they shall be understood to refer to this specification and/or the accompanying drawings and addenda.
- .2 The words "provided", "install" or similar words shall mean the work described shall be completely supplied, and erected or installed by the Contractor, unless otherwise noted.
- .3 All materials are to be new unless noted otherwise.

1.5 EXAMINATION OF SITE

- .1 All bidders submitting tenders for this work shall first examine the site and all conditions thereon and/or therein, including:
 - .1 Existing site conditions visually evident at the time of tender upon which the Work of this Contract will be installed.
 - .2 Conditions attached to, abut against or in any other way affected by existing conditions.
- .2 All tenders shall take into consideration all such conditions as may affect the work under this Contract.
- .3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the Work.
- .4 Pre-Tender Site Meeting to be scheduled by the Consultant.

1.6 EXISTING CONDITIONS

- .1 If in the performance of the contract, subsurface or latent conditions at the site are found to be materially different from those indicated by the drawings and specifications, or unknown conditions not usually inherent in work of the character shown and specified, the attention of the Consultant shall be called immediately in writing to such conditions before they are disturbed. Upon such notice or resulting from his own observation of such conditions the Consultant shall promptly make such changes in the drawings and specifications as he finds necessary to conform to the different conditions and any increase or decrease in the cost shall be adjusted as provided under Changes in the Work.

1.7 DOCUMENT INTERPRETATION

- .1 The Consultant's interpretation of Contract Documents shall be final.
- .2 Should the Bidder find discrepancies in, or omissions from the drawings, specifications or other tender documents, or be in doubt as to their meaning or interpretation, the Bidder should at once notify the Consultant in writing for clarification.
- .3 Any instructions or clarifications to Bidders issued during the period of bidding will be in the form of Addenda and are to be included in the tender. Addenda will form part of the Contract Documents.
- .4 The Owner or Consultant will not be responsible for verbal instructions.
- .5 Addenda will be distributed by fax and/or email.
- .6 Every effort will be made to issue addenda not less than five (5) days prior to the time for the closing of tenders, at the Consultant's discretion.

1.8 PREPARATION AND SUBMISSION OF BIDS

- .1 Contractors shall submit their bids on the Tender Form provided, which will be received at the time and place indicated on the Invitation to Tender. Late tenders will not be accepted and will be returned unopened to the bidder.
- .2 Bidders shall fill in all information requested on the Tender Form.
 - .1 This form must be completely filled out in ink, or be typewritten with the signature in longhand. The completed forms shall be without interlineation, alteration or erasure.
 - .2 Failure to fill in the Tender Form, as provided, in its entirety may result in the rejection of the bid; however, bidders are not obligated to provide alternative prices to products listed on the Appendix provided for that specific purpose, as part of the tender form.
 - .3 Tender amount shall be stated both in writing and in figures.
 - .4 Signatures shall be without alteration or erasure.
 - .5 Receipt of addenda for the project shall be acknowledged by filling in the addendum number and date of issue for each addendum on the appropriate line on the Tender Form. These lines shall be initialed by the person signing the tender after they have been filled in.
- .3 Each tender submitted will be accepted on the understanding that it covers all the Work called for in the specifications and on the drawings, regardless of any notations by Bidder that certain parts of the required Work are omitted from their proposal.
- .4 Each bid must:
 - .1 Give the full business address of the Bidder and be signed by him with his usual signature.
 - .2 Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name of one of the members of the partnership or by some authorized representative, followed by the signature and designation of the person signing.
 - .3 Bids by corporations must be signed with the legal name of the corporation, followed by the name of the Province of incorporation, and by the signature designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signed shall also be typed or printed below the signature.
 - .4 A bid by a person who affixes to his signature the word "president," "secretary," or "agent," or other designation, without disclosing his principal, may be held to be the bid of the individual signing on behalf of the corporation.
 - .5 A bid of any individual or any group of individuals operating as co-partners or the bid of any corporation which may be submitted shall be executed and authorized so that it shall be and it will constitute a legal binding act of the persons, co-partners, or corporate entity making the bid.
- .5 Bidders shall include with their tender, in the space designated in Section 00 41 13, Appendix A, the name of each Subcontractor and/or Supplier, as designated, whose price has been included in their tender and who will perform the trade work. Substitution for another Subcontractor in the event that the listed Subcontractor is unable to do the work shall be subject to the approval of the Owner and contingent on evidence satisfactory to the Owner that the original Subcontractor's price was legitimately carried in the Tender, and that the original Subcontractor is now incapable of carrying out the work required under the subcontract, or that he refuses to carry out the work and provides documented reasons for such incapacity or refusal.
- .6 When a Bidder indicates "Own Forces" as a subcontractor, the Bidder may be required to demonstrate to the Owner that he has the resources, experience and employees necessary, available and qualified to perform the trade work in a manner and quality satisfactory to fulfill the obligations of the Contract Documents and that the trade work is

- a normal and continual part of his business operation.
- .7 The Owner will evaluate Tenders submitted for this project. The criteria to be considered by the Owner in awarding the Contract will include a combination of:
- .1 Bid price;
 - .2 Scheduling;
 - .3 Compliance;
 - .4 Expertise;
 - .5 Qualifications of the Contractor and named Subcontractors / Suppliers and
 - .6 Any other such conditions as may be determined by the Owner to be in the best interests of the Owner. A decision on the acceptance of a Tender will be made by the Owner based on the results of the Owner's evaluation.
- .8 Bidders may, at their own discretion, submit Alternatives to items identified as "Acceptable Material".
- .1 All proposed Alternatives shall be listed in Appendix "B", ALTERNATIVE PRICES and be identified by name and model number where applicable and each Alternative shall have an associated tender price change "INCREASED BY" \$_____ or "DECREASED BY" \$_____ or "N/A," as compared with the "Acceptable Material" item carried in the tender amount.
 - .2 Alternate prices will include ALL related costs associated with charges from Accepted Material. No additional costs will be accepted for failure of the Contractor to identify the full impact of using alternate systems.
 - .3 Alternate prices will NOT be used in determining the tender price or as the basis for awarding the tender.
- .9 Bidders are to complete any other appendices forming part of the Tender Form as directed under Section 00 41 13 - Bid Form.
- .10 Tender Forms and accompanying documents shall be enclosed in a sealed envelope marked "TENDER" and bearing the following identification.
- .1 Name of project.
 - .2 Name of Contractor submitting tender.
- .11 Envelope to be addressed to the recipient of tenders indicated in the Invitation to Tender and delivered by hand, registered mail or courier.
- .12 Submit one (1) only signed copy of Tender Form.
- .13 Accompanying the Tender Form shall be:
- .1 One (1) copy of Bid Guarantee, together with Surety's Letter of Consent, as specified.
 - .2 One (1) copy of a preliminary schedule demonstrating the full scope of work to be completed within the identified time for the completion of the contract work.
 - .3 One (1) copy of a letter from Bidder's insurance provider identifying a list of any claims made against the Bidder within the last five (5) years.
- .14 Tender forms and securities must bear original signatures.
- .15 Where the bid amount is shown in both written words and number and the two are in conflict, written words will take precedence.

1.9 BID GUARANTEES

- .1 Each tender submitted shall be accompanied by the following Security:
 - .1 For a General Contract Tender less than Three Million Dollars (\$3,000,000.00):
 - .1 A Security Deposit in the form of a Certified Cheque or Bank Draft, in an amount not less than ten per cent (10%) of the Bid Amount;
OR
 - .2 A Bid Bond as identified below.
- .2 The Certified Cheque, Bank Draft or Bid Bond shall be made payable to the Owner.

- .3 The Certified Cheque, Bank Draft or Bid Bond will guarantee that:
 - .1 The Bidder will not withdraw the bid for the period indicated on the Tender Form, following the schedule closing time of the receipt of bids, and
 - .2 The Bidder will enter into a formal agreement with the Owner in accordance with the agreement included as part of the Contract Documents, and
 - .3 The required Certified Cheque, Bank Draft or Bid Bond as Contract Security will be provided to the Owner, and
 - .4 In the event of withdrawal of said bid within said period, or the failure to enter into said Agreement and give said contract security within ten (10) days after notice of the acceptance of the bid, the Bidder shall be liable to the Owner for the full amount of the bid guarantee as representing the liquidating damages to the Owner on account of the default of the Bidder in any particular hereof and shall not be construed as a penalty.
- .4 Bid Bonds or Security Deposits will be returned to all except the three (3) lowest Bidders within three (3) days after the opening of tenders. The remaining non-successful Bid Bonds or Security Deposits will be mailed to Bidders within forty-eight (48) hours after the Owner and the successful Contractor have executed the Contract and the duly executed Bonds or Certified Cheque representing the Contract Security have been received and accepted by the Owner from the successful Contractor.
- .5 Bonds and Letters of Surety, provided by General Contractors to the Owner shall be from a recognized Surety Company.
- .6 Only Bid Bonds issued by insurers, licensed in Canada and authorized to do business in the Province of Prince Edward Island, will be accepted.
- .7 Security Deposits provided by General Contractors:
 - .1 Must be in the form of a Certified Cheque or Canadian Bank Draft drawn on a bank to which the Bank Act applies or a Credit Union, payable to the Owner, OR
 - .2 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:
 - .1 Payable to the Bearer, or
 - .2 Accompanied by a duly executed Instrument of Transfer to the Owner in the form prescribed by the Domestic Bonds of Canada Regulations, or
 - .3 Negotiated as to principal or as to principal and interest in the name of the Owner, pursuant to the Domestic Bonds of Canada Regulations.
 - .3 Security Deposits submitted by Subcontractors to General Contractors, shall be in a form satisfactory to the General Contractor.
 - .4 No interest will be paid to either the successful or unsuccessful bidders for any form of Bid Guarantee.

1.10 CONTRACT SECURITY

- .1 Upon award of a Contract, the Contractor shall provide the following Contract Security:
 - .1 For a General Contract Tender less than Three Million Dollars (\$3,000,000.00):
 - .1 A Performance Bond and a Labour and Materials Bond, each in the amount of fifty per cent (50%) of the total Contract Amount, or
 - .2 A Security Deposit in the form of a Certified Cheque or Bank Draft, in an amount not less than ten per cent (10%) of the total Contract Amount.
 - .2 All Bonds provided by General Contractors, are to be made payable to the Owner.
 - .3 Bonds shall be from a recognized Surety Company, licensed in Canada and authorized to do business in the Province of Prince Edward Island.
 - .4 If a Performance Bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the Total Performance Certificate.
 - .5 Security Deposits, provided by the General Contractor:
 - .1 Must be in the form of a Certified Cheque or Bank Draft drawn on a bank to

- which the Canadian Bank Act applies, or a Credit Union, payable to the Owner,
OR
- .2 Bonds of the Government of Canada, unconditionally guaranteed, as to the principle and interest by the Government of Canada if such Bonds are:
 - .1 Payable to the Bearer, or
 - .2 Accompanied by a duly executed Instrument of Transfer to the Owner, in the form prescribed by the Domestic Bonds of Canada Regulations, or
 - .3 Negotiated as to principle or as to principle and interest in the name of the Owner pursuant to the Domestic Bonds of Canada Regulations.
- .6 Contract Security shall be provided at the expense of the General Contractor. Cheques or Bank Drafts shall be drawn on an account with recognized Financial Institutions.
- .7 Contract Security submitted by Subcontractors to General Contractors, shall be in a form acceptable to the General Contractor.
- .8 No interest will be paid to the successful Contractor on any form of Contract Security.
- .9 If in accordance with the Contract Security requirements the successful Contractor has used a Certified Cheque or Bank Draft as Contract Security, the Certified Cheque or Bank Draft will be deposited in a safety deposit box in a bank until the date of Substantial Performance for the Contract as defined under Definition 19 of CCDC2-2008. Subject to the Work being acceptable to the Owner and Consultant it will be returned to the Contractor, without interest. The Certified Cheque or Bank Draft used as contract Security used through the construction period will be replaced with a Certified Cheque or Bank Draft in the amount of 20% of the original Contract Security during the Warranty Period. Subject to Warranty issues being addressed during the 1-year Warranty Period to the satisfaction of the Owner and Consultant it will be returned to the Contractor, without interest.

1.11 RECEIPT AND OPENING OF BIDS

- .1 Bids will be opened publicly at the time and place stated in the Invitation to Tender. The officer whose duty it is to open them will decide when the specified time has arrived. No responsibility will attach to any officer for the premature opening of a bid not properly addressed and identified.
- .2 Telegraphed, telephoned or facsimile transmitted bids will not be considered.
- .3 Any firm which has submitted a tender has the privilege of being present at the bid opening.

1.12 ADJUSTMENT AND WITHDRAWAL OF BIDS

- .1 Bids may be withdrawn or adjusted in writing by mail, delivered in person or telegram or facsimile transmission delivered to the party to whom the bids were submitted, provided such withdrawal or adjustment is prior to the time fixed for the opening of the bids. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal or adjustment of the bid after the expiration of the time within which bids may be submitted.
 - .1 All withdrawals or adjustments to previously submitted tenders must be faxed to Coles Associates Ltd. at (902) 566-3768, prior to the time fixed for the opening of bids.
 - .2 Neither the Owner nor Coles Associates Ltd. accepts responsibility for the Contractors inability to submit faxed modifications within the allotted time for such circumstances, including but not limited to power and equipment failures, transmission failures, paper outages, busy fax line, etc.
 - .3 Adjustments must be signed by the same person who signed the original bid.

1.13 AWARD OF CONTRACT

- .1 The Contract, if awarded, will be awarded as promptly after the opening of bids as is

possible, and at the discretion of the Owner. The award date will not extend beyond the period indicated on the Tender Form following the scheduled time of tender closing, without first obtaining permission of the three (3) low bidders, or low bidder only, at the discretion of the Owner.

- .2 The Form of Agreement, (Contract) which the successful Bidder will be required to enter into with the Owner, may be seen on application to the Consultant. The drawings, specifications and any addenda issued during the tender period, will be suitably marked for identification at the time the Form of Agreement is signed by both parties, shall be considered as being included in the Contract, together with the completed Tender form and are hereinafter referred to as the "Contract Documents." All of these documents shall be read together and construed as one document. Following execution of the Contract, the Contractor shall receive from the Owner one (1) complete signed set of Contract Documents.
- .3 Final award of Contract shall be subject to approval of all agencies having direct interest in the project.
- .4 Where identical bids are received, the low bidder will be selected on the basis of a coin toss by the Owner in the presence of the identical bidders.

1.14 REJECTION OF BIDS

- .1 The Owner reserves the right to reject any and all bids.
- .2 The lowest or any bid will not necessarily be accepted.
- .3 Bids submitted which indicate "own forces" for subcontract work, that in the opinion of the Owner cannot be successfully completed by the Contractor's employees will not be accepted.
- .4 Bids not submitted on the required form will be rejected.
- .5 Bids which are incomplete or qualified will be rejected.
- .6 All Bidders acknowledge that they shall have no claim against, or entitlement to damages from the Owner or Consultant by reason of the Owner's rejection of their individual bids or all bids.

1.15 SUBCONTRACT WORK

- .1 Contractor is to ensure that all Subcontractors understand the full extent of their responsibilities in order to complete the entire work of the project. Subcontract work may appear in various Sections of Specifications and on various Drawings.
- .2 Contractors and their Subcontractors are advised to become familiar with all specifications and drawings.

1.16 CONDITIONS OF WORK AND EMPLOYMENT IN PEI

- .1 All Construction Companies and Contractors and subcontractors submitting tenders for this work, or a portion thereof, are advised, in their own interest, to contact the Construction Association of Prince Edward Island, the accredited association for commercial and industrial sectors of the construction industry, to inquire and determine the terms and conditions of work and employment in the Province of Prince Edward Island.

1.17 LABOUR

- .1 No prospective employee in the Province of Prince Edward Island shall, with relation to his employment or eligibility for employment, be discriminated against or favored by reason of sex, racial origin, religious views, or political affiliations.
- .2 Contractors, to the extent possible, are encouraged to maximize the employment of the local labour force for the Work of this Contract.

1.18 HARMONIZED SALES TAX REQUIREMENTS

- .1 The Owner for this project must account for the Harmonized Sales Tax (HST).

- .2 All tenders submitted for the work of this Contract shall be calculated on the basis that the Owner is not exempt from HST. The bid will exclude HST but will show it as a separate line item.

1.19 ACCEPTABLE PRODUCTS

- .1 The Bidder shall carry in his tender the base bid product(s) identified in the specifications as "Acceptable Material", or Approved Equals as they are identified throughout the tender period.
- .2 The Bidder is also encouraged to carry the products of other manufacturers, that are not considered equals, as "Alternatives Prices," listing them by name on the Appendix provided for that specific purpose, as part of the Tender Form, together with the price difference compared to the specified products, when such Appendix is identified under Section 00 41 13 - Bid Form.

1.20 APPROVED EQUALS

- .1 Submission for an Approved Equal is to contain literature and descriptive information with full specification data. Where the requested item is contained on a printed document with other items, it is to be clearly identified.
- .2 The Consultant will not search catalogs, e-mails or websites or contact suppliers to obtain the necessary information for proper evaluation.
- .3 Submission by Bidders for evaluation of products requested to be considered as equal must be submitted to Consultant no less than 5 working days prior to closing of tenders. No consideration will be given to approving equals after the close of tenders, except when the specified product is found to have been discontinued by the manufacturer.
- .4 The consideration of a product(s) for Approved Equal status and the acceptance of individual products as approved equals is entirely at the discretion of the Consultant.
- .5 When products are given Approved Equal status these products may, at the discretion of bidders, be carried in their tender price, provided that ALL costs related to changes to the contract work required to incorporate the Approved Equal product are included in the tender price.
- .6 The acceptance of a product by the Consultant as an "Approved Equal," even where not specifically indicated on the Approved Equals listing in the Addendum, is to be understood as being contingent upon the provision of the particular series, model and/or type, complete with all options to meet the specified requirements of the Acceptable Material product.
- .7 Products given approved status that are found, during construction period, to not have all specified options available, or to have discontinued production of same, or to have made other design changes since the time of approval, will not be accepted for use on this project, except when financial compensation has been mutually agreed upon between the Contractor and the Owner and deemed acceptable by the Consultant. Compensation will not be paid to the Contractor for products acknowledged by the Consultant to be superior to the specified products.

1.21 ALTERNATIVES

- .1 Alternative products, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "B" provided as part of the Tender Form, and are to be understood as being offered only for the Owner's consideration as substitutes for the specified Acceptable Material products, at the amount of increase or decrease in the tender amount indicated in the Appendix. These products and related prices are not to be included in the tender amount.
- .2 Alternative products and their related increase or decrease in the base bid amount are not used as the basis for awarding tenders.
- .3 When alternative products are listed in Appendix "B", ALL costs related to changes to the contract work required to incorporate the alternative product into the work are to be

included in the amount stated in Appendix "B".

- .4 Alternative products may or may not be accepted at the discretion of the Owner at the price difference quoted, without any other monetary consideration. If requested, bidders shall promptly supply full details of any or all Alternatives listed. Specific written direction from the Consultant must be given to the Contractor to substitute an alternative product.
- .5 Alternative prices shall include all fees, taxes and markups.

1.22 UNIT PRICES

- .1 Unit Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "C", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or not accepted, at the Owner's discretion in a timely manner during the Work of the Contract, ONLY as a method of adjustment to the Contract Work for changes in the Work, should the Owner opt for the Unit Price Method.
- .2 Unit prices shall include all fees, taxes and markups.

1.23 SEPARATE PRICES

- .1 Separate Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "D", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or, not accepted, in whole or in part, at the Owner's discretion. If used the Separate Prices may be incorporated into the Contract Work either at the time of Award of Contract or in a timely manner during the Work of the Contract, at the Owner's discretion.
- .2 Separate Prices shall include all fees, taxes (excluding HST) and markups.

1.24 GUARANTEES

- .1 The Contractor will be required to guarantee the work of this Contract in accordance with the requirements of GC12.3 of the Agreement.
- .2 Notwithstanding the above, the bidder's attention is directed to the fact that certain individual items on this project may be required to be guaranteed by the manufacturer for periods in excess of twelve months. These specific requirements are to be found in various Sections of the specifications for this project.

1.25 PAYMENT OF WORKERS

- .1 The Contractor shall, in addition to any fringe benefits, pay the workers employed by the Contractor on the work at wage rates, not less than those established by the Minimum Wage Order, issued under authority of the Labour Act, which is in effect. The Contractor shall pay workers employed on the work at intervals of not less than twice per month.
- .2 The Contractor shall require each Subcontractor, or person doing any part of the work, to covenant with the Owner that workers are employed at the wage rates and in the manner required by this provision.
- .3 Where any person employed by the Contractor or any Subcontractor, or other person engaged on the Work of this Contract, is paid less than the amount required to be paid under the provisions of this Contract, the Owner may deduct from any monies payable to the Contractor, under this or any other Contract, and pay to such person, a sum sufficient to bring the person's wages up to the amount required to be paid under this Contract.
- .4 No claim for extra payment from the Contractor will be considered by the Owner concerning any change in the Minimum Wage Order which may occur during prosecution of the Contract.

1.26 CONFIDENTIALITY AND FREEDOM OF INFORMATION

- .1 By submitting your bid, you agree to disclosure of the information supplied, subject to the provisions of the Freedom of Information and Protection of Privacy (FOIPP) Act.

- .2 Anything submitted in your bid that you consider to be "confidential information" because of its proprietary nature should be marked as "Confidential", and will be subjected to appropriate consideration under the Freedom of Information and Protection of Privacy Act.
- .3 During the delivery and installation of goods and/or services, you may have access to confidential or personal information. Should this occur, you must ensure that such information is not released to any third party or unauthorized individual.
- .4 Any information provided on this contract may be subjected to release under the Freedom of Information and Protection of Privacy Act. You will be consulted prior to the release of any information.

1.27 TIMING REQUIREMENTS

- .1 This project will require the achievement of the following project milestones.
 - .1 Tender Call 15 MAR 2021.
 - .2 Pre-tender Site Meeting 22 MAR 2021.
 - .1 Site meeting will take place at Cabot Beach Provincial Park @ 1:00 PM.
 - .3 Tender Close 29 MAR 2020.
 - .1 Location of Tender Closing:
Offices of Coles Associates Ltd., 85 Fitzroy Street, Suite 201.
 - .4 Tender Award 01 APR 2021.
 - .5 Construction Start 06 APR 2021.
 - .6 Substantial Completion 30 NOV 2021.
- .2 The lagoon expansion must be completed before the Park scheduled seasonal opening date on the 4th of June 2021. The 3 way sites construction to start after Park scheduled closure on the 15 of September 2021. Bidders to clearly identify construction activities and dates on the submitted construction schedules.
- .3 The local utility (Maritime Electric Company Limited - MECL) is scheduled to supply and install the Cabot Park high voltage electrical equipment at the end of September 2021. Contractor to coordinate high voltage delivery and installation with MECL.

END OF SECTION

1 General

1.1 TENDER

.1 SUBMITTED BY:

_____(Name)
_____(Address)
_____(Contact)

DATE: _____

FOR: PROJECT NAME: Cabot Beach Provincial Park
3-Way Site Expansion
LOCATION: Malpeque Bay, PE

TO: PROJECT OWNER: Government of Prince Edward Island as represented by
the Minister of Economic Growth, Tourism and Culture.
LOCATION: Charlottetown, PE

Having examined ALL the drawings and specifications for this project, as well as any addenda issued, as prepared by Coles Associates Ltd. and/or their consultants; WE HEREBY OFFER to furnish all materials, plant and labour necessary for the full and proper completion of the Contract work for:

PROJECT NAME: Cabot Beach Provincial Park
3-Way Site Expansion
LOCATION: Malpeque Bay, PE

INCLUDING all prime cost allowances and Government sales or other taxes in force at this date, EXCLUDING Harmonized Sales Tax (HST) but not any other additional or deductible allowances or taxes which may be applicable subsequent to this date, and which shall be payable by or to the Owner, in accordance with the above mentioned Documents, for the bid amount of:

_____(Dollars)
(\$)

in lawful money of Canada.

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

In the event of this Tender being accepted within thirty (30) days of the time stated for the closing of Tenders, and our failing or declining to enter into a Contract, then our Bid Guarantee, submitted with our Tender shall be forfeited to the Owner in lieu of any damages which the Owner may suffer by reason of our failure or refusal to enter into such Contract.

In the event of our Tender not being accepted within thirty (30) days of the time stated for the closing of Tenders, our Bid Guarantee, submitted with our Tender will be returned to

us forthwith, unless a satisfactory arrangement is made with us covering its retention for a further stated period.

If we are notified of the acceptance of this Tender within the above specified time, we will:

- .1 Enter into a formal Contract Agreement with the Owner.
- .2 Furnish the Performance Bond and Labour and Materials Payment Bonds, or other form of Contract Security, when specifically permitted, as Contract Security in accordance with the requirements of the specifications.
- .3 Furnish a cost breakdown of the Contract sum, the total aggregating the amount of our Tender, in accordance with the requirements of the specifications.
- .4 Furnish a certified copy of all insurance policies.
- .5 Furnish a certified copy of all insurance policies carried by the named subtrades.
- .6 Complete the entire work on or before the dates stated.
- .7 Provide and update as required a Construction Schedule which clearly shows the state of progress required to complete the work on the date specified.
- .8 Enter into subcontract agreements where applicable.

1.2 ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

- .1 Addendum No. _____ Issued: _____ initial
- Addendum No. _____ Issued: _____ initial
- Addendum No. _____ Issued: _____ initial
- Addendum No. _____ Issued: _____ initial
- Addendum No. _____ Issued: _____ initial

1.3 FORM OF TENDER APPENDICES

- .1 Appendix 'A' must be completed by bidders.
- .2 Appendix 'B' (only the items indicated) may be completed by bidders, any other items are at the bidder's discretion.
- .3 Appendix 'C' must be completed by bidders.
- .4 Appendix 'D' must be completed by bidders.

1.4 DOCUMENTS ACCOMPANYING BID FORM

- .1 As per Section 00 21 13, Par 1.8.16
- .1 One (1) copy of Bid Guarantee, together with Surety's letter of consent. _____ initial
 - .2 One (1) copy of preliminary schedule. _____ initial
 - .3 One (1) copy of letter from Bidders Insurance Provider identifying list of claims made against Bidder within last five (5) years. _____ initial

1.5 SUPERINTENDENT

- .1 Name of Superintendent _____.
- .2 Years of Experience with Contractor _____.

1.6 CONFLICT OF INTEREST

- .1 The Contractor warrants that as at the date of this Agreement, no conflict of interest, or any circumstance that might interfere with independent and objective exercise of judgment, exists or is likely to arise in relation to execution of this Agreement or its subject matter. The Contractor shall immediately notify Government, in writing, if any such actual or potential conflict of interest should arise at any time during the Term. In the event Government discovers or is notified by the Contractor of an actual or potential conflict of interest, Government, in its sole discretion, may either:
- .1 Allow the Contractor to resolve the actual or potential conflict to the satisfaction of Government;
OR
- .2 Terminate the Agreement in accordance with the Termination section of this Agreement.

1.7 CONTRACTOR'S SIGNATURE

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

(Company Name)

(Address)

(Authorized Signature)

(Witness)

(Name and Title)

(Name and Title)

(Date)

1.8 APPENDIX 'A'

- .1 Herewith are identified the Subcontractors we propose to use on this project. Carrying Sub-Contractor options next to identified work, is not acceptable and may be cause for rejection of the Tender by the Owner.

Site Demolition: _____

Site Work: _____

Water & Sewer Systems: _____

Mechanical: _____

Electrical: _____

Controls: _____

Lagoon: _____

Fence: _____

Reinstatement & Landscaping: _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.9 APPENDIX 'B'

.1 ALTERNATIVE PRICES

We herewith submit for consideration by the Owner the following systems or products as Alternatives to the Base Bid items indicated below and identify the increase or decrease, as applicable, in our tender price, for each item should it be selected by the Owner for installation in lieu of the Base Bid item. The change in tender price includes for all necessary modifications to the base bid systems.

Alternative prices shall include all fees, taxes and markups.

SECTION ITEM BASE BID ALTERNATIVE:	TENDER PRICE INCREASED BY:	TENDER PRICE DECREASED BY:
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.10 APPENDIX 'C'

.1 UNIT PRICE COMPONENT

We submit herewith our Unit Prices for the additions or deletions to the work listed below. The Unit Prices listed apply to performing the Units of Work, in accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Unit prices shall include all fees, taxes and markups.

	UNIT OF WORK	ONE (1) UNIT PRICE ONLY FOR EITHER ADDITION OR DELETION
.1	50mm Ø Forcemain (LM)	\$ _____
.2	50mm Ø Watermain (LM)	\$ _____
.3	100mm Ø Sewer Piping (LM)	\$ _____
.4	100mm Ø Sewermain (LM)	\$ _____

* NOTE: Above unit prices are to include supply, install, excavation, backfilling, compaction and connection to systems.

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.11 APPENDIX 'D'

.1 CASH ALLOWANCES

The undersigned hereby acknowledges that the sum of:

THIRTY THOUSAND DOLLARS - \$30,000.00

is included in the total tender amount as Cash Allowances, to perform the following work:
This money to be expended in accordance with the requirements of CCDC2 2008
General Condition GC4.1 - Cash Allowances, only on consultant's written instructions.

WORK:

Work associated with Lagoon Dewatering, Sludge Removal and other
site work as directed by the Owner.

Contractors are advised to carry sufficient overhead and administration cost to
administer and coordinate this work.

The undersigned hereby acknowledges that the sum of:

FOUR THOUSAND FIVE HUNDRED DOLLARS - \$4,500.00

Is also included in the total tender amount as a separate amount to cover the cost of the
Harmonized Sales Tax (HST) related to the above Cash Allowances.

In the event that the Owner decides not to proceed with any or all of this work, we agree
to credit the Contract with the unused portion of the full amount of these Cash
Allowances, as applicable, and the related HST.

COMPANY: _____

AUTHORIZED SIGNATURE: _____

END OF SECTION

1 General

1.1 FORM OF AGREEMENT

- .1 The Form of Agreement between Contractor and Owner shall be Canadian Construction Documents Committee CCDC2-2008, "Stipulated Price Contract", including the Definitions and General Conditions therein dated 2008 including items GC1.1 inclusive to GC12.3, and the modifications to items GC1.1 to GC12.3 incorporated into Section 00 73 00 - Supplementary Conditions of this Specification.
- .2 Document CCDC2-2008 may be examined at the Construction Association office in Charlottetown, PEI.

END OF SECTION

1 General

1.1 GENERAL

- .1 The Definitions and General Conditions governing the Work shall be those specified in the following amendments and supplements to those provisions, and shall apply to all Sections of this Specification.
- .2 Where any Article or portion of Article conflicts with the Laws of the Province concerned, such Article or portion of the Article is hereby stricken.
- .3 The following amendments shall apply to the Definitions of CCDC2 Stipulated Price Contract 2008.

1.2 DEFINITIONS

- .1 Paragraph 4 Consultant, add the following:
 - .1 The Consultant shall be the Owner's Prime Consultant, Coles Associates Ltd., 85 Fitzroy Street, Charlottetown, PEI.
- .2 Paragraph 12 Owner, add the following:
 - .1 The Owner shall be the Government of Prince Edward Island as represented by the Minister of Economic Growth, Tourism and Culture.
- .3 Paragraph 19 Subcontractor, add the following:
 - .1 All dealings with the Subcontractor shall be through the medium of the Contractor, who will be responsible for the proper coordination and execution of the Sub-contractor's work.
- .4 New Paragraph 27 Engineer:
 - .1 This shall mean the designated engineering representative(s) of the Consultant.

1.3 ARTICLE GC1.1 CONTRACT DOCUMENTS

- .1 Paragraph 1.1.8 - Delete as written and substitute:
1.1.8 The Contractor shall receive up to five (5) sets of drawings and specifications at no cost from the Owner. Additional sets of drawings will be supplied at cost of reproduction. The above covers the requirements for all trades.
- .2 Paragraph 1.1.11 - Add new Paragraph as follows:
1.1.11 The Contract Documents are prepared solely for use by the party with whom the Consultant has entered into a Contract and there are no representations of any kind made by the Consultant to any party with whom the Consultant has not entered into a Contract.
- .3 Paragraph 1.1.12 - Add new Paragraph as follows:
1.1.12 Electronic documents are and shall remain the Consultant's property. Copies of electronic documents may be made available for the preparations of shop drawings at the Consultant's sole discretion and for a fee.

1.4 ARTICLE GC3.1 CONTROL OF THE WORK

- .1 Paragraph 3.1.1 - add new Sub-Clause 3.1.1.1 as follows:
 - .1 The Contractor shall co-ordinate his own work and the work of all Subcontractors so as to facilitate and expedite the progress of the work.
- .2 Paragraph 3.1.1 Add new Sub-Clause 3.1.1.2 as follows:
 - .1 It is the responsibility of the Contractor to immediately notify the Consultant of any signs of distress or any other indications of actual or potential damage to the contract work, without regard to his awareness of any errors, inconsistencies or omissions in the Contract Documents.
- .3 Add new Paragraph 3.1.3 as follows:
 - .1 Before ordering any materials or doing any Work, Contractor shall verify all compensation has been allowed on account of differences between actual site

dimensions and the measurements indicated on the drawings. Any difference, which may be found, shall be submitted to the Consultant for consideration before proceeding with the work.

.4 Add new Paragraph 3.1.4 as follows:

- .1 The Contractor will be responsible for effecting the removal from the site of any trade, firm, group or person who is delaying the Work, or whose Work is unsatisfactory. The Contractor will arrange for other competent trades people to complete the Work at no expense to the Owner.

1.5 ARTICLE GC3.6 SUPERVISOR

.1 Add new Paragraph 3.6.3 as follows:

- .1 The Consultant may require the Contractor to inform him, in writing, of the name and experience of the supervisory personnel he intends to use on the project.

1.6 ARTICLE GC3.8 LABOUR AND PRODUCTS

.1 Add new Paragraph 3.8.4 as follows:

- .1 All manufactured articles, materials and equipment shall be installed, applied, connected, erected, used, cleaned, conditioned and commissioned as directed by the manufacturer unless specified to the contrary.

1.7 ARTICLE GC3.9 DOCUMENTS AT THE SITE

.1 Add new Paragraph 3.9.2 as follows:

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Notice of Change.
 - .7 Change Orders.
 - .8 Other Modifications to Contract.
 - .9 Field Test Reports.
 - .10 Approved Work Schedule.
 - .11 Health and Safety Plan and Other Safety Related Documents.
 - .12 CSA Z317.13-07 - Infection Control Guidelines.
 - .13 Other documents as specified.

1.8 ARTICLE GC4.1 CASH ALLOWANCES

.1 Article GC4.1 - Delete this article.

1.9 ARTICLE GC4.2 CONTINGENCY ALLOWANCE

.1 Article GC4.2 - Delete this article.

1.10 ARTICLE GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Paragraph 5.2.2 - add two new Sentences as follows:

- .1 Payment shall be less any holdback release, which may have been made in accordance with the specific terms of this Agreement as dictated by GC 5.6. Any such holdback release by the Owner to the Contractor shall be a payment to the Contractor in trust for the specific Subcontractor in respect of whose work the release is made.
- .2 Payments shall be less 15% Mechanics' Lien Holdback amount claimed against each progress claim.

- .2 Add new paragraph 5.2.6 as follows:
 - .1 Authorized Change Orders shall be listed on the application for payment indicating the amount claimed against each to date of claim.
- .3 Paragraph 5.2.7 - Add new sentences as follows:
 - .1 Payment for materials will be considered only if such materials are properly stored on site in a secure enclosure acceptable to the Consultant. Security of materials so stored is the responsibility of the Contractor.
- .4 Add new Paragraph 5.2.8 as follows:
 - .1 With the second and all subsequent applications for payment the Contractor shall include a statutory declaration form CCDC 9B, or other similar form acceptable to the Consultant, declaring that all labour and materials entering into the work, including Subcontractors, covered by the previous application, have been paid. With application for release of lien holdback, the Contractor shall include a statutory declaration form CCDC 9A, or other similar form acceptable to the Consultant.
 - .2 With the second and all subsequent applications for payment the Contractor shall include a Letter of Clearance from the PEI Workers Compensation Board.

1.11 ARTICLE GC5.3 PROGRESS PAYMENT

- .1 Paragraph 5.3.1 - Add new Sentence as follows:
 - .1 When any claim for payment during the course of construction includes for completed or partially completed Work, which in the opinion of the Consultant is defective or otherwise unacceptable, a sum of monies determined by the Consultant to be two (2) times the value of the defective or unacceptable Work, or two (2) times the value of the Work required to correct the defect or an amount solely at the Consultants discretion, will be withheld from the claim.
- .2 Paragraph 5.3.1 - Add 3 new Sentences as follows:
 - .1 Deficiency monies may be held back at any time during the course of the project for Work deemed incomplete or unacceptable.
 - .2 It remains the Contractor's responsibility to undertake his own deficiency reviews and ensure the entire Work conforms to the Contract including quality, completeness and commissioning.
 - .3 Two final deficiency reviews will be conducted by the Consultant. The first review with the Owner and Contractor will identify any minor items which may remain outstanding, and the second review will confirm that these items have been completed. All other deficiency reviews where deficiencies are incomplete or not ready for requested inspections, will be charged at cost to the Contractor. The invoice for the additional reviews will be submitted to the Owner with a corresponding amount deducted from the Contractor's progress payment.

1.12 ARTICLE GC5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Paragraph 5.5.1, Add new Sub-Clause .3 as follows:
 - .1 5.5.1.3 Submit with application for payment letter of clearance from The Workers Compensation Board to the Owner stating that the Contractor is in good standing with the Board.

1.13 ARTICLE GC5.7 FINAL PAYMENT

- .1 Paragraph 5.7.2 - Add new Sentence as follows:
 - .1 Any delay in delivering the required Project Record Drawings (As-Built) as described in Section 01 78 00 - Closeout Submittals will have the effect of delaying the final payment to the Contractor until the Consultant has received them complete and in good condition.

1.14 ARTICLE GC6.2 CHANGE ORDER

- .1 Delete Paragraph 6.2.1 and replace with a new paragraph as follows:
 - .1 6.2.1 When a change in Work is proposed or required, the Consultant will provide the Contractor with a written description of the proposed change in the Work. The Contractor shall promptly present, in forms acceptable to the Consultant, a detailed breakdown of the costs associated with the change, if any; and the adjustment in the Contract Time, if any. The breakdown shall include:
 - .1 Actual (not list) costs of material, as well as Subtrade and Supplier costs.
 - .2 Labour costs, including fringe benefits and wage levies.
 - .3 Equipment rental (excluding hand and small power tool).
- .2 Change Orders calling for normal changes or additions to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.
- .3 Each Change Order will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.
- .4 To these prices, the Contractor will add:
 - .1 For Work over \$2,500, involving the General Contractor only, the General Contractor adds 10% to his costs.
 - .2 For Work involving a Subcontractor only, the Subcontractor adds 10% to his costs, submits this price to the General Contractor who adds 5%.
 - .3 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders.
 - .4 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be added as additional charges for a Change order.
- .5 Note: Costs related to management, supervision, estimating, scheduling, bonding, insurance, as built drawings, copying, courier, safety, cleaning, site overhead, site vehicle, hand and small power tools etc. are covered by the mark up indicated in Paragraph 6.2.1.4 and shall not be included on Change Orders.

1.15 ARTICLE GC9.1 PROTECTION OF WORK AND PROPERTY

- .1 Add new Paragraph 9.1.5 as follows:
 - .1 The Contractor shall be responsible for implementing all necessary security measures required to protect the areas of Work under his control and shall be responsible for damage which may arise from the failure of, or the failure to implement such security measures.

1.16 ARTICLE GC10.1 TAXES AND DUTIES

- .1 Paragraph G.C. 10.1.1 - Revise as follows:
 - .1 Delete the words "...at the time of closing except for Value Added Taxes" and replace with the words "...at the time of closing including Value Added Taxes"...

1.17 ARTICLE GC10.2 LAWS, NOTICES, PERMITS, AND FEES

- .1 Paragraph G.C. 10.2.2 - Delete "the building permit" and add the new sub-clause 10.2.2.1 as follows:
 - .1 Where required, the Contractor shall apply for, obtain and pay for permit(s).

1.18 ARTICLE GC11.1 INSURANCE

- .1 Paragraph 11.1.1.4: Delete and replace with following:
 - .4 Builders Risk, in the names of the Contractor, the Owner, the Sub- Contractors and the Consultant. As applicable. The policy shall commence from the date of the commencement of Work until the earliest of:

- (1) 10 calendar days after the date of substantial Performance of the Work;
 - (2) On the commencement of use or occupancy of any part or section of the Work unless the use or occupancy is for construction purposes, or for the installation, testing and commissioning of equipment forming a part of the Work;
 - (3) When left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
 - (4) The Contractor shall provide evidence of Course of Construction Property Insurance, that is all risk, replacement cost blanket limit, with an agreed amount endorsement and includes boiler and machinery coverage as noted in 11.1.1.5 and 11.1.1.6. Said coverage will include completed operations coverage for 24 months after completion to the full value of the building or structure as required by the Owner. Coverage for "X,C, U exposures shall be included along with loss of use.
- .2 Paragraph 11.1.2:
 - .1 Delete "if required" on the second line. (A certified true copy as described, MUST be promptly provided within 3 days of contract award). Add the following at the end of the sentence. "All insurance is primary and will not require the sharing of any loss with any Owner Insurance Program."
- .3 Add new Paragraph 11.1.9 Indemnity/Hold Harmless:
 - .1 The Contractor shall be liable for all injuries to persons and for damage to property caused by his operations, and those of his sub-contractors, and his and their employees, engaged on all operations in connection with the contract both on and off the site, and he shall indemnify and save harmless the Owner from all suits, claims, expenses, costs, demands, losses and damages to which the Owner may be put to reason of injury including death, to persons, and damages to property of the Owner and others, resulting from negligence, carelessness and any other cause whatsoever in the performance of the work.
 - .2 The Contractor shall, until the date of issue of the final Certificate of Approval of the work by the Consultant, indemnify and save harmless the Owner, and protect his own interests against:
 - .1 Theft, burglary or robbery of, and loss or damage to, all materials and equipment brought to the site for use in the work, whether or not such material and equipment are incorporated in the work at the time that any such theft, burglary, robbery, loss or damage occurs.
 - .2 Theft or burglary of, and loss or damage to, any of his own plant and equipment being used on the project and/or stored on the site.
- .4 Add new Paragraph 11.1.10:
 - .1 The Contractor shall, without limiting its obligations or liabilities herein and at its own expense, provide and maintain the following insurances with Insurers and in forms and amounts acceptable to Government, Commercial General Liability Insurance in an amount not less than five million dollars (\$5,000,000) inclusive per occurrence against bodily injury including death, and property damages. The Owner is to be added as an insured under this policy. Such insurance shall include but not limited to:
 - .1 Products and Completed Operations Liability;
 - .2 Owners and Contractors Protective Liability;
 - .3 Cross Blanket Written Contractual Liability;
 - .4 Personal Injury Liability;
 - .5 Cross Liability;

- .6 Broad Form Property Damage;
 - .7 Employees as Additional Insured's;
 - .8 Operations and Premises Liability.
 - .9 The Contractor shall not commence work under this contract until he has obtained all of the liability insurance specified and such insurance has been approved by the Owner, nor shall the Contractor allow any sub-contractor to commence work on his sub-contract until all similar insurance required of the sub-contractors has been obtained. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder nor shall such approval imply the contractor has fulfilled all the terms and conditions of this Contract. Upon expiration of any policies during the period of this Contract, new Certificates of Insurance showing renewal shall be forwarded. In the event, that the Contractor carried a blanket-type policy, an endorsement by the insurance company is required confirming coverage of this specified project and indicating the extent of coverage.
- .5 Add new Paragraph 11.1.11: In all insurance policies required under this agreement:
- .1 There shall be an endorsement stating that the insurer will provide 30 days' notice to the Province's Risk Manager (or the acting or assistant) of cancellation or material change in coverage;
 - .2 The insurer shall acknowledge that the policy is primary and any other insurance policies that may be in effect or any other sources of recovery the including the Government of Prince Edward Island's Self Insurance and Risk Management Fund shall not contribute in any way to any judgments, awards, payments, or costs or expenses of any kind whatsoever made as a result of actual or alleged claims. The Ultimate Recipient shall provide the Province with current certificates of insurance, in a form and content reasonably acceptable to the Province, evidencing the required insurance policies hereunder within ten (10) days of the Effective Date and on each renewal of the insurance policies thereafter. Umbrella insurance may be used to achieve the required insured limits above.

1.19 **ARTICLE GC12.3 WARRANTY**

- .1 Add new Paragraph 12.3.7 as follows:
 - .1 When a part of the work is occupied by the Owner, directly or for the use intended prior to Substantial Performance, the warranty for the Work directly related to the construction and normal operation of that part of the Work, shall start on the date of occupancy.
- .2 Add new paragraph 12.3.8 as follows:
 - .1 The Contractor shall ensure that his subcontractors are bound to the requirements of GC12.3 insofar as their work is concerned.

END OF SECTION

1 General

1.1 SCOPE OF WORK

- .1 The Contractor is to provide each item, and properly execute all work as specified herein, indicated by drawings, addenda, or change orders issued with respect to this project.
- .2 The Contractor shall coordinate, administer, and supervise all work, material acquisition and labour.
- .3 Contractor shall coordinate with Owner and facilitate installation of Owner provided equipment.

1.2 WORK BY OTHERS

- .1 Co-operate and coordinate with other Contractors in carrying out the respective works and carry out instructions from Consultant.
- .2 Schedule the Work of this Contract in consultation and cooperation with the Work of other Contractors and/or Owners own forces to produce a coordinated construction schedule.

1.3 COORDINATION

- .1 All Trades on site are responsible to co-operate and co-ordinate with each other.
- .2 Coordination prior to installation of all site services is mandatory.

1.4 DAMAGE

- .1 Where damage is done to work in progress or existing areas of the site and is unclaimed by a Trade, the cost to repair the damage will be assessed by the Consultant and assigned on a pro-rated tender cost basis to all Trades on site at the time the damage occurred.

1.5 DEDUCTIONS FOR UNCORRECTED WORK

- .1 If, in the opinion of the Consultant, it is not expedient to correct defective work or work not done in accordance with the Contract documents, the Owner may deduct from the Contract price the difference in value between the work as done and that called for by the Contract, the amount of which shall be determined in the final instance by the Consultant.

1.6 CORRECTION AFTER COMPLETION

- .1 Subject to any special provisions in the Contract documents, the Contractor shall remedy any defects due to faulty materials or workmanship appearing within a period of one (1) year from the date of substantial completion of the work and shall pay for any damage to other work resulting there from which appears within such period and neither the final certificate nor payment there under shall relieve the Contractor from responsibility hereunder. The Owner shall give notice of observed defects promptly. Questions arising under this Article may be decided as provided in Article 43.

1.7 DOCUMENTS

- .1 The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all.
- .2 Descriptions of materials or work which have well known technical or trade meanings shall be held to refer to such recognized standards.
- .3 Should the specifications conflict with the drawings, the specifications shall govern.
- .4 In the case of discrepancies between drawings, those of larger scale, or if the scale are the same, those of later date shall govern.
- .5 All drawings and specifications shall be interpreted in conformity with the agreement.

1.8 PROTECTION OF WORK AND PROPERTY

- .1 The Contractor shall maintain continuously adequate protection of all their work from damage and shall take reasonable precautions to protect the Owner's property from all injury arising in connection with this Contract. The Contractor shall make good any damage or injury to their work and shall make good any damage or injury to the property of the Owner resulting from the lack of reasonable protective precautions. The Contractor shall not be responsible, however, for any damage or injury to their work and to the property of the Owner which may be directly due to errors in the Contract documents or caused by the Owner, their agents, or employees, or from any work or risk which the Owner has agreed to insure, provided the Contractor has taken reasonable protective precautions. The Contractor shall adequately protect adjacent property as required by law and the Contract documents.

1.9 COMMUNICATION

- .1 All submissions and inquiries shall be directed to the Consultant for review.
- .2 All direction will be transmitted to the Contractor by the Consultant.

1.10 CODES AND REGULATIONS

- .1 Perform work in accordance with National Building Code of Canada (NBC) 2015 and any other code of provincial or local application, provided that in any case of conflict or discrepancy the more stringent requirements shall apply.
- .2 Meet or exceed requirements of contract documents and specified standards.
- .3 References to standards, including manufacturer's direction for installation shall be the latest edition.
- .4 All materials, components and equipment as well as construction methods shall comply with the applicable codes, standards and Provincial regulations.
- .5 All equipment supplied or installed shall be CSA approved for the intended use.
- .6 The latest edition of the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.
- .7 Provide a copy of all certificates of acceptance issued by Provincial or local authorities.

1.11 WORK SCHEDULE AND PROGRESS REPORTS

- .1 The Contractor will prepare and maintain a consolidated schedule in weekly increments showing scheduled work versus actual work. The schedule shall indicate the contract commencement and completion date for the total project.
- .2 The Contractor is to develop a detailed schedule identifying specific components of the mechanical, sprinkler, refrigeration and electrical trades. A single line items for each is not acceptable.
- .3 Provide updated schedule information from time to time as the progress of the work or Consultant may require.
- .4 The Contractor shall furnish monthly progress reports from the date of commencement. These reports shall show the percentage of completion of the various divisions of work and contain comments on the general progress of the project.

1.12 CONTRACTOR'S USE OF SITE

- .1 Do not unreasonably encumber site with materials or equipment.
- .2 Move stored products or equipment, which interfere with operations of Consultant or other Contractors.
- .3 Obtain and pay for use of additional off site storage or work areas needed for operations.
- .4 The work related to modifying the site roadways must be carried out so that one half of the roadway is open to vehicle traffic at all times.

1.13 PROJECT MEETINGS

- .1 Hold weekly bi-project meetings at the site, in the Contractor's site office and at a time approved by Consultant. In addition hold any additional meetings as the need arises or as directed by the Consultant.
- .2 Notify all parties concerned of such meetings.
- .3 The Contractor will record minutes of meetings and distribute to all parties within three (3) days of meeting.
- .4 Failure of the Contractor to accurately record minutes or distribute the minutes in a timely manner will result in the Consultant taking over the duties invoicing the owner and deducting an equal amount from the progress claims as compensation.

1.14 SITE INSPECTOR

- .1 No work is to be covered without having received approval from the Consultant. The Consultant will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.
- .2 This work shall be examined by the Consultant and approval granted to resume when a satisfactory solution has been found out.
- .3 The Construction Manager does not have authority to authorize changes to work. He or she shall confer with the Consultant who, if necessary will authorize any change.
- .4 The fact that the Construction Manager or Consultant does not reject any work shall not remove the responsibility for completing all work as specified from the Contractor.

1.15 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations.
- .2 Provide all equipment, materials and devices needed to lay out and construct work.
- .3 Supply such devices as straight edges and templates required to facilitate Consultant's inspection of work.

1.16 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Consultant of impending installation and obtain his approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.17 CUTTING, FITTING AND PATCHING

- .1 Execute cutting, core drilling, fitting and patching, required to install and make new work under this contract fit properly.

1.18 EXISTING SERVICES

- .1 Before commencing work, establish the location and extent of service lines and notify Consultant of findings if in conflict with information or intent shown.
- .2 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .3 Contractor shall pay for any or all repairs to existing services that have been damaged due to the Contractor's negligence in the course of his work.
- .4 Notify Consultant and utilities of intended interruption of services and obtain permission.
- .5 Where Work involves breaking into or connecting to existing services, give Consultant 24 hours notice for necessary interruption. Minimize duration of interruptions. Carry out Work at times as directed by governing authorities or Owner with minimum disturbance.

- .6 Provide alternative routes for personnel and vehicular traffic.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by Authorities Having Jurisdiction.
- .9 Record locations of maintained, re-routed and abandoned service lines.
- .10 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.19 ACCESS AND SECURITY

- .1 Access and security on the entire job site will be the responsibility of the Contractor.

1.20 ADDITIONAL DRAWINGS

- .1 The Consultant may furnish as necessary for the execution of the work, additional instructions, by means of drawings or otherwise. All such additional instructions shall be consistent with the contract documents. In giving such additional instructions the Consultant shall have authority to make minor changes in the work, consistent with the Contract.

1.21 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during the work, shall remain property of the Owner. Protect such articles and request directives from Consultant.
- .2 Give immediate notice to Consultant if evidence of archaeological finds are encountered during construction, and await Consultant's written instructions before proceeding with work in this area.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Owner/Contractor Agreement.
- .2 Canadian Construction Documents Committee (CCDC).
 - .1 CCDC 2-2008, Stipulated Price Contract.
- .3 Section 00 73 00 - Supplementary Conditions.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Make applications for payment on account as provided in Agreement as Work progresses.
- .2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.
- .3 Submit to Consultant, at least 14 days before first application for payment, Schedule of Values for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

- .1 Make schedule of values out in such form and supported by such evidence as Consultant may reasonably direct and when accepted by Consultant, be used as basis for applications for payment.
- .2 Include statement based on schedule of values with each application for payment.
- .3 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.
- .4 Provide, minimum fourteen (14) days before submitting first application for payment, a Schedule of Values, aggregating the Total Contract Price. After approval by the Consultant the Schedule of Values will be used as a basis for the application for progress payments.
- .5 Contractor shall submit with the Schedule of Values, an itemized list of all trades and applicable labour rates for each, which will be used as a basis for labour rates in changes to contract Work.
- .6 The schedule of values is to indicate separate line items each for commissioning and operation & maintenance manuals.

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS

- .1 Submit separate Schedule of Unit Price items of Work requested in Bid form.
- .2 Make form of submittal parallel to Schedule of Values, with each line item identified same as line item in Schedule of Values. Include in unit prices only:
 - .1 Cost of material.
 - .2 Delivery and unloading at site.
 - .3 Sales taxes.
 - .4 Installation, overhead and profit.
- .3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 PROGRESS PAYMENT

- .1 Consultant will issue to Owner, no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be properly due. If Consultant amends application, Consultant will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to Section 00 73 00 - Supplementary Conditions.
- .2 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work or substantial performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of Work designated portion thereof which Owner agrees to accept separately is substantially performed. Failure to include an item on list does not alter responsibility to complete Contract.
- .3 No later than 10 days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than 7 days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
- .4 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.
- .5 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 After issuance of certificate of Substantial Performance of Work:
 - .1 Submit an application for payment of holdback amount.
 - .2 Submit sworn statement that all accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in any way be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
- .2 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.
- .3 Where holdback amount has not been placed in a separate holdback account, Owner shall, 10 days prior to expiry of holdback period stipulated in lien legislation applicable to Place of Work, place holdback amount in bank account in joint names of Owner and Contractor.
- .4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work. Owner may retain out of holdback amount any sums required by law to satisfy any liens against Work or, if permitted by lien legislation applicable to Place of Work, other third party monetary claims against Contractor which are enforceable against Owner.

1.8 FINAL PAYMENT

- .1 Submit an application for final payment when Work is completed.
- .2 Consultant will, no later than 10 days after receipt of an application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than 7 days after reviewing Work.
- .3 Consultant will issue final certificate for payment when application for final payment is found valid.

END OF SECTION

1 General

1.1 APPOINTMENT AND PAYMENT

- .1 The Contractor will arrange and pay for the services of an independent Consultant to carry out the following tests:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Consultant.
 - .6 Additional tests specified in Article 1.3.7 below.
 - .7 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.

1.2 CONTRACTOR'S RESPONSIBILITIES - GENERAL

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Consultant sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Consultant.
- .5 Provide Consultant with two (2) sets of fully documented test reports, submitted immediately following the testing operations.

1.3 CONTRACTOR'S RESPONSIBILITIES - INSPECTION & TESTING REQUIREMENTS

- .1 Contractor to arrange and pay for the services of a certified material testing firm to carry out the following:
 - .1 Soil compaction tests;
 - .2 Clay liner material and testing during construction.
- .2 Testing of all soil material types at source, including collection of sample material by testing firm, to verify compliance with material specifications.
- .3 Follow up testing of all soil material types delivered to site.
- .4 Monitoring placement and verifying compaction densities.
- .5 Monitoring of upgrading work.
- .6 Verifying the new compaction densities.
- .7 Testing work may occur under various Sections of the Specification.

1.4 FINAL REPORT

- .1 Submit to the Owner at completion of job, two (2) bound hard copies and one (1) electronic copy of inspection report. This report to include:
 - .1 All copies of test results, indexed to correspond with testing requirements of this

Section.

- .2 Written report from the testing firm carrying out the work of this Contract stating that the work as itemized under Par. 4 of this Section has been performed in strict accordance with the requirements of the Contract documents.
- .3 The report will be signed and sealed by a Professional Engineer registered to practice in the Province of Prince Edward Island and practicing in the field of materials testing.

END OF SECTION

1 General

1.1 TIME AND ORDER OF COMPLETION

- .1 The Consultant may direct the Contractor in writing as to the time, precedence or order in which any work to be done under the contract shall be performed.

1.2 TIME OF COMMENCEMENT

- .1 The Contractor shall commence work within three (3) days after the execution of the Contract, unless specifically indicated or directed otherwise by the Consultant, and shall proceed continuously, diligently and with all reasonable dispatch consistent with the Construction Schedule, and the proper execution of the work, until final completion. The rate of progress made with the work shall be such as to ensure its final completion within the specified time.

1.3 TIME OF COMPLETION

- .1 The whole of the work to be done under this contract shall be finally completed in full accordance with all the terms and conditions of this contract on or before the day specified for such completion in the tender which forms part of this contract.
- .2 The Contractor will be responsible for all costs incurred for failure to complete the project within the project schedule, plus 20 working days.
- .3 Costs for Insurance and bonding extensions, Consultant fees for extended services and Construction Management services and expenses for extended services will all be totaled and charged against the Contractors. Costs will be deducted from Progress Claims.

1.4 EXTENSION OF TIME

- .1 An extension of time may be granted in writing by the Consultant in the event of the work being delayed beyond the prescribed time for completion as a result of causes beyond the Contractor's control. Such extensions shall be for such time as the Consultant may prescribe, and the Consultant shall fix the terms on which the said extension may be granted. An application by the Contractor for an extension of time shall be made to the Owner in writing as least fifteen calendar days prior to the date of completion fixed by the contract. Where applicable, all bonds or other surety including Liability Insurance furnished to the Owner by the Contractor shall be amended where necessary at the expense of the Contractor to provide coverage beyond the date of any extension of time granted, and the Contractor shall furnish the Owner with evidence of such amendment of the bonds or other surety and Liability Insurance.
- .2 Any extension of time that may be granted to the Contractor shall be so granted and accepted without prejudice to any rights of the Owner whatsoever under the Contract, and all of such rights shall continue in full force and effect after the time limited in the Contract for the completion of the work and whenever in the Contract, power and authority is given to the Consultant or any person to take any action consequent upon the act, default, breach, neglect, delay, non-observance or non-performance by the Contractor in respect of the work or Contract, or any portion thereof, such powers or authorities may be exercised from time to time and not only in the event of the happening of such contingencies before the time limited in the Contract for the completion of the work but also in the event of the same happening after the time so limited in the case of the Contractor being permitted to proceed with the execution of the work under an extension of time granted by the Consultant.

1.5 SUSPENSION OF WORK

- .1 The Contractor shall, upon written notice from the Consultant, discontinue or delay any or all of the work when, in the opinion of the Consultant, it is unwise to proceed for any reason whatsoever, and the work shall not be resumed until the Consultant shall in

writing so direct.

1.6 LABOUR DISPUTE

- .1 Except to the extent that relief is granted under of the Contract, the Contractor shall bear the risk and responsibility of any loss, damage or expense to the work or to himself or any nature and kind whatsoever arising from strikes or labour disputes other than such loss, damage or expense caused by the failure of the Owner to meet its obligations under the Contract.

1.7 CHARACTER AND EMPLOYMENT OF WORKERS

- .1 The Contractor shall employ only orderly, competent and skillful workers to do the work and shall give preference to available residents in the area of the Contract. Whenever the Consultant shall inform the Contractor in writing that any person or persons on the work are, in the opinion of the Consultant, incompetent, unfaithful or disorderly, such person or persons shall be discharged from the work and shall not again be employed on the work without the consent in writing of the Consultant.

1.8 LIMITATIONS OF OPERATIONS

- .1 The Consultant may, in writing, require the Contractor to cease or limit operations under the Contract, on any day or days if the operations are of such nature that the Consultant deems it necessary or expedient to do so.
- .2 The Contractor shall cooperate with other contractors, utility companies and the Owner and they shall be allowed free access to their work at all times. The Consultant reserves the right to alter the method of operations on this Contract to avoid interference with other work.
- .3 The Contractor shall have access to their work to allow the incorporation of a double shift if the Contractor deems it necessary to meet the obligations under the contract.

END OF SECTION

1 General

1.1 GENERAL

- .1 All submittals are to be delivered within 30 days of award of Contract.
- .2 Make specified submittals to the Consultant at commencement of Contract, before beginning work on site (and no later than 10 days after award). Include:
 - .1 Contract Security
 - .2 Proof of Insurance
 - .3 Workers' Compensation clearance letter
 - .4 Cost Breakdown
 - .5 Permits as required
 - .6 Construction schedule for Trade Package activity
 - .7 Corporate Safety Plan
 - .8 Site specific safety plan
 - .9 Shop drawing schedule
- .3 During Construction provide:
 - .1 Updated trade construction schedule
 - .2 Shop drawings as required
 - .3 Inspection and test reports
 - .4 Request for Information
 - .5 Submission required for payment purposes
- .4 At completion of Work provide
 - .1 Submission at completion of work as specified in Project Close Out, Commissioning, and Operations and Maintenance Data Sections.

1.2 ADMINISTRATIVE

- .1 Refer to GC 3.10 Shop Drawings
- .2 Submit to Consultant submittals listed for review. Submit 10 working days after award of contract in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, 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 considered rejected.
- .7 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify field measurements and affected adjacent Work are coordinated.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .11 Keep one reviewed copy of each submission on site.

1.3 SUBMITTAL SCHEDULES:

- .1 Within 10 days following award of contract, prepare and submit a summary of all

- submittals required by the Trade Package.
- .2 Submittal schedule shall be formatted as follows:

- | SECTION
NUMBER | ITEM/
EQUIP | SHOP DWG
DEL DATE | ORDER
DATE | ITEM
DEL DATE |
|-------------------|----------------|----------------------|---------------|------------------|
|-------------------|----------------|----------------------|---------------|------------------|
- .3 The initial submission shall include completion of the first 3 columns of the above table example. Once approved shop drawings are received by the Contractor, the balance of the summary shall be updated and submitted accordingly.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. 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 10 days for Consultant's review of each submission.
- .4 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .5 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .6 Submissions include:
- .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, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .7 After Consultant's review, distribute copies.
- .8 Submit digital copy of all shop drawings, product data sheets, reports, MSDS sheets and other traditional paper submissions.

- .9 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .10 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .11 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .12 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .13 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .14 Submit two (2) hard copies of Operation and Maintenance Data for requirements requested in specification Sections, plus one (1) electronic copy and as requested by Consultant.
- .15 Delete information not applicable to project.
- .16 Supplement standard information to provide details applicable to project.
- .17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, transparency will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.5 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where color, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Prince Edward Island
 - .1 Occupational Health and Safety Act, R.S.P.E.I. 1988.
- .4 CSA C22.1-2002 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- .5 CSA C22.3 No. 1-M87 (R2001) - Overhead Systems.
- .6 CSA C22.3 No. 7-94 (R2000) - Underground Systems.
- .7 CSA - S269.1 - [1975] Falsework for Construction Purposes.
- .8 CAN/CSA - S269.2 - [M87] Access Scaffolding for Construction Purposes.
- .9 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .10 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
 - .1 FCC No. 301 - June 1982 Standard for Construction Operations.
 - .2 FCC No. 302 - June 1982 Standard for Welding and Cutting.
 - .3 FCC standards, may be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Part 1:
List of individual health risks and safety hazards identified by hazard assessments.
 - .2 Part 2:
List specific measures to control or mitigate each hazard and risk identified in part one of Plan. State engineering controls, personal protective equipment and safe work practices to be used for work having identified hazard(s) or risk(s).
 - .3 Part 3:
Emergency and Communications Measures as follows:
 - .1 Emergency Procedures: standard operating procedures, evacuation measures and emergency response implemented on site during an accident or incident. State step by step procedures, applicable to each identified hazard.
 - .2 Emergency Communications: list names and telephone numbers of officials, to be contacted if incident, accident or emergency situation occurs, including:
 - .1 General Contractor and all Subcontractors.
 - .2 Provincial Departments and resources from local emergency organizations, based on type of hazard, incident or accident which might occur and as stipulated in applicable laws and regulations.
- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant.

- .4 Submit copies of incident and accident reports.
- .5 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 2 days after receipt of comments from Consultant.
- .7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .9 Maintain Worker's Compensation Coverage for duration of contract. Submit Letter of Good Standing to Consultant.

1.3 DEFINITIONS

- .1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
- .2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.
- .3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
- .4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
- .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 PERMITS

- .1 Obtain permits, licenses and compliance certificates, at appropriate times and frequency as stipulated by authorities having jurisdiction.
- .2 Post all permits on site. Submit copies to Consultant.

1.5 FILING OF NOTICE

- .1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

1.6 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.7 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.

- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.8 MEETINGS

- .1 Preconstruction Conference:
 - .1 The safety officer shall attend and chair the preconstruction conference and prepare a comprehensive agenda for the conference.
- .2 Meeting On Work Procedures:
 - .1 Meet with Contracting Officer to discuss work procedures and safety precautions. Ensure the participation of the Contractor's superintendent, the quality control, officer and representatives of each subcontractor or trade performing work at the site.
- .3 Weekly Safety Meetings:
 - .1 Hold weekly at the project site. Prepare minutes showing contract title, signatures of attendees, a list of topics discussed and meeting minutes.
- .4 Work Phase Meetings:
 - .1 The appropriate activity hazard analysis shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.
- .5 Prior to commencement of work hold Health and Safety meeting. Have Contractor's Site Superintendent in attendance.
- .6 Provide site safety orientation session to all workers, all workers new to the site and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site. Maintain records of orientation on site.
- .7 Conduct site specific occupational health and safety meetings for the duration of the work as follows:
 - .1 Formal meetings on a minimum monthly basis.
 - .2 Informal tool box meetings on a regular basis from a predetermined schedule.
- .8 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:
 - .1 Progress of Work;
 - .2 New sub-trades arriving on site and;
 - .3 Changes in site and project conditions.
- .9 Record and post minutes of meetings. Make copies available to Consultant upon request.

1.9 SITE SAFETY OFFICER (SSO)

- .1 Employ and assign to Work, competent and authorized representative as Site Safety Officer (SSO). The SSO must:
 - .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .2 The selection of the SSO will be subject to the approval of the Consultant, and changes shall be made as requested by the Consultant.

- .3 The SSO shall be responsible for ensuring that all provisions of the Health and Safety Plan and relevant legislation are implemented.
- .4 The SSO shall ensure that all monitoring and testing, as specified and at the direction of the Consultant, are conducted.
- .5 The SSO shall maintain records of all readings that are taken by the Contractor report and any abnormal or dangerous situation to the Consultant and the Municipality, after having implemented emergency measures, as required, work shall not continue or proceed until the situation has been rectified.
- .6 The Safety Officer shall be at the work site at all times whenever work or testing is being performed, shall conduct daily safety inspections.
- .7 The SSO shall be authorized to act on behalf of the Contractor on all matters related to Health and Safety.
- .8 Qualifications of Site Safety Officer:
 - .1 Ability to manage the on-site Contractor safety program through appropriate management controls.
 - .2 Ability to identify hazards and have the capability to expend resources necessary to abate the hazards.
 - .3 Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.
 - .4 Shall, as a minimum, have attended a recognized training qualification program including at least 40 hours of classroom instruction.
- .9 Qualifications of Qualified Person, Confined Space Entry:
 - .1 The qualified person shall be capable (by educations and specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety.

1.10 RECORD KEEPING

- .1 ALL activities associated with Health and Safety shall be recorded daily in a bound notebook. Include as a minimum: activity date, time, location of occurrence, mitigation action taken and results. Records shall be assessed by the Consultant.

1.11 SUSPENSION OF ACTIVITIES

- .1 Exposure to contaminants shall be controlled so that no worker is exposed to contaminants at a concentration greater than the Time Weighted Average (TWA) concentration for the contaminant, for up to a 10 hour workday, 40 hour work week.
- .2 The Contractor will halt activities immediately during unsafe conditions. All costs relating to suspension of work for Contractor's failure to maintain Health and Safety procedures shall be borne by the Contractor.
- .3 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.12 HEALTH AND SAFETY PLAN

- .1 Prior to commencement of the work, submit to the Consultant a detailed Health and Safety Plan for review. The Health and Safety Plan shall comply with the provisions of this section, and shall illustrate the Contractor's knowledge and understanding of health and safety aspects of the work, the Contractor's intention to maintain a high level of safety on-site, and shall include, but not be limited to:
 - .1 Description of Work.
 - .2 Description of Site-specific Hazards:
 - .1 Physical
 - .2 Chemical

- .3 Environmental
- .3 Protective Equipment:
 - .1 Respiratory
 - .2 Contact
- .4 Decontamination Procedures:
 - .1 Personal protective equipment (PPE)
 - .2 Equipment
 - .3 Infection Control personal protective equipment required by CSA Z317.13-03.
- .5 Medical - Monitoring:
 - .1 Workers medical profile and suitability to work at the site.
- .6 Air - Monitoring Procedures:
 - .1 Action levels
 - .2 Site monitoring
 - .3 Perimeter monitoring
- .7 Emergency Procedures:
 - .1 Emergency Equipment
 - .2 Contingency Plans:
 - .1 Spill control
 - .2 Fire
 - .3 Ventilation
 - .4 Medical Emergency
- .8 General Safety:
 - .1 Designation of site-safety officer
 - .1 Safety log
 - .2 Trenching, digging, excavations
 - .3 Storage of flammables, compressed gases
 - .4 Safety inspections
- .9 Site Training:
 - .1 Initial hazard
 - .2 Daily safety
- .2 All workers shall be trained and be familiar with the Health and Safety Plan and the use of personal protective equipment.
- .3 Safety Document Submission:
 - .1 Ensure Safety Document Submission applies to Work of this specific project and site.
 - .2 Submit two (2) copies of Safety Document at the Pre-Construction Meeting. Do not commence Work nor deliver material on-site prior to submission.
 - .3 Included in Safety Document submission specific information detailing the methods and procedures to be implemented ensuring adherence to the acts, regulations, codes and policies specified in this section and to:
 - .1 Ensure the health and safety of persons at or near the Work; including, but not limited to, the Public.
 - .2 Ensure the measures and procedures of the regulatory agencies specified are carried out.
 - .3 Ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.
 - .4 Where changes to the methods and procedures in the execution of work change submitted safety methods and procedures, modify submitted Safety Documentation and submit modifications, in writing to the

- Consultant and Minister prior to implementation.
- .4 Safety Document Organization:
 - .1 Organize information in the form of an instructional manual as follows:
 - .1 Place in binders of commercial quality, 8-1/2" x 11" x 3" maximum ring size.
 - .2 Cover: Identify binder with typed or printed title "Project Safety Document" and list the title of the project.
 - .3 Provide tabbed fly leaf for each separate heading, with typed heading on tab.
 - .4 Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size text pages.
 - .5 Arrange content under Safety Document headings specified herein.
 - .5 Safety Document Headings:
 - .1 Employee Safety Training:
 - .1 Place, under this heading, a statement indicating employees working on this specific project have met specified training requirements.
 - .2 Company Safety Policy
 - .1 Place, under this heading, information pertaining to the company's policy and commitment to Occupational Health and Safety, including the responsibilities of management, supervisors and works.

1.13 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.
- .2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:
 - .1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.
 - .2 The scope of work has been changed by Change Order.
 - .3 Potential hazard or weakness in current health and safety practices are identified by Consultant or by an authorized safety representative.
- .3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Consultant for inspection.
- .4 Contractor to conduct a hazard assessment in conjunction with the Owner's maintenance staff as part of the planning process including isolating existing equipment where applicable and identification of hidden services where anchoring is required. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.14 COMPLIANCE REQUIREMENTS

- .1 Observe and enforce construction safety measures required by National Building Code, latest edition, National Fire Code, Provincial Building Code Act, Worker's Compensation Act and Municipal Statutes and Authorities.
- .2 Comply with Canada Labour Code and Canada Occupational Health and Safety Act.
- .3 Latest edition of the Occupational Health & Safety Act Statutes of Prince Edward Island (including any amendments to and regulations).
- .4 Fire Prevention Act.
- .5 Dangerous Goods Transportation Act.
- .6 Industrial Best Practices for Equipment Isolation and Lockout Policy.

- .7 In case of conflict or discrepancy the more stringent requirement shall apply.
- .8 Maintain clear emergency exit paths.
- .9 Ensure that employees working on this specific project have met training requirements as legislated by the Prince Edward Island Occupational Health and Safety Act and its regulations.
- .10 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 and workplace.
- .11 Provide Consultant with Material Safety Data Sheets (MSDS).
- .12 Provide and maintain first aid equipment, supplied and medications appropriate to the work and its location in accordance with the First Aid Regulations. Obtain and implement recommendations from Occupational Health and Safety Division specific to the project work site.

1.15 WHMIS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada and Provincial Department of Labour.
- .2 Submit WHMIS data sheets to Consultant in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Maintain WHMIS information station and ensure designated personnel are trained in its use.
- .4 Submit copies of all Tool Box or Safety Meeting notes.
- .5 Submit copies of all Worksite Safety Inspections.

1.16 SMOKING, ALCOHOL & RESTRICTED SUBSTANCES

- .1 Worksites are inherently dangerous, including travelling to and from the site.
- .2 Alcohol, medical and recreational cannabis are restricted substances governed by Federal and Provincial laws as are other forms of illegal drugs.
- .3 The smoking of or use of tobacco products, including e-cigarettes, the use of alcohol and restricted substances including cannabis in any form in the building or on the work site is strictly prohibited.
- .4 Where workers have a prescription for medical cannabis, or other prescription drugs that may cause drowsiness, they are to advise their supervisor and discuss with their supervisor safe and appropriate task(s) while under the influence of these prescriptions on the worksite.
- .5 Workers who violate this requirement will be removed from the worksite.

1.17 SITE CONTROL AND ACCESS

- .1 Control work site and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.
- .2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Consultant.
- .3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required.
- .4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction area(s) as being "off limits" to non-authorized persons. Signage must be professionally made.

1.18 PROTECTION

- .1 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.
- .2 Use personal protection equipment as required by Occupational Health and Safety Act and as required by this site.
- .3 Training of workers in the proper use, fitting, inspection and storage of personal protective equipment shall be done prior to use of the equipment.

1.19 UNFORESEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Consultant verbally and in writing.

1.20 TESTING AND MONITORING

- .1 Test and monitor for hazardous conditions, as required to demonstrate compliance with provincial regulations.
- .2 If multiple locations are being worked simultaneously, provide monitoring at all locations where work is being carried out, including providing additional monitoring instruments.

1.21 ISOLATION OF EXISTING SERVICES

- .1 Obtain Consultant's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.
- .2 To obtain authorization, submit to Consultant following documentation:
 - .1 Written Request for Isolation of the service or facility and;
 - .2 Copy of Contractor's Lockout Procedures.
 - .3 Make a Request for Isolation for each event, unless directed otherwise by Consultant, and as follows:
 - .1 Fill-out standard forms in current use at the Facility when so directed by Consultant or;
 - .2 Where no form exist at Facility, make request in writing identifying:
 - .1 Identification of system or equipment to be isolated, including it's location;
 - .2 Time duration, indicating Start time & date and Completion time & date when isolation will be in effect.
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
 - .3 Document to be in typewritten format.
 - .4 Do not proceed until receipt of written notification from Consultant granting the Isolation Request and authorization to proceed with the isolation of designated equipment or facility. Consultant may designate other individual at the Facility as the person authorized to grant the Isolation Request.
 - .5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.
 - .6 Plan and schedule shut down of existing services in consultation with the Consultant and the Facility Manager. Minimize impact and downtime of facility operations.
 - .7 Determine in advance, as much as possible, in cooperation with the Consultant, the type and frequency of situations which will require a Request for Isolation. Follow Consultant's directives in this regard.

- .8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.22 LOCKOUTS

- .1 Perform lockouts in compliance with:
 - .1 Canadian Electrical Code
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
 - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
 - .4 Procedures specified herein.
- .2 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting work on such items.
- .3 Develop and implement lockout procedures to be followed on site as an integral part of the Work.
- .4 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .5 Use industry standard lockout tags.
- .6 Provide appropriate safety grounding and guards as required.
- .7 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment.
- .8 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:
 - .1 Controlling issuance of permits or tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Submitting a Request for Isolation to Consultant when required by Contractors and / or Owners safety plan.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.
 - .7 Collecting and safekeeping lockout tags, returned by workers, as a record of the event.
- .9 Clearly establish, describe and allocate, within procedures, the responsibilities of:
 - .1 Workers.
 - .2 Designated person controlling issuance of lockout tags/permits.
 - .3 Safety Watcher.
 - .4 Subcontractors and General Contractor.
- .10 Procedures shall meet the requirements of Provincial and Federal Codes and Regulations.
- .11 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.
 - .1 Incorporate site specific rules and procedures established by Facility Manager and in force at site. Obtain such procedures through Consultant.
- .12 Procedures to be in typewritten format.

- .13 Submit copy of Lockout Procedures to Consultant, in accordance with submittal requirements, prior to commencement of work.

1.23 CONFORMANCE

- .1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.
- .2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.
- .3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Consultant's discretion with possible disciplinary measures imposed as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.24 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.

1.25 POWER ACTUATED DEVICES

- .1 Use power actuated devices only after receipt of written permission from Consultant.

1.26 HANDLING AND TRANSPORTATION OF DANGEROUS GOODS

- .1 Observe and enforce all measures required by the regulatory agencies including but not limited to Environment Canada, Prince Edward Island Department of Environment, and Transport Canada.
- .2 Most current regulatory guidelines and Acts will apply to the work.
- .3 In case of any conflict, the more stringent requirements will apply.

1.27 OPEN EXCAVATIONS

- .1 If open foundations or demolition areas are to be left at the end of a work day, protective fencing must be placed around the entire perimeter to limit access by others. Fencing to be self-supporting, approved by the Department of Labour and the Construction Safety and Industrial Safety Regulations.

1.28 POTENTIAL HAZARDS

- .1 Hazards include, but are not limited to, toxic, flammable and explosion hazards associated with cleaning solvents.
- .2 The Contractor shall become familiar with all potential hazards associated with the work, and shall take necessary measures to avoid injury or damage of any kind.

1.29 HAZARDOUS MATERIALS

- .1 Should material resembling hazardous materials, other than those identified with the Contract Documents, including but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.
- .2 Any material which contains asbestos that is disturbed or removed during construction work, shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act. All costs for proper cutting, removal and disposal of all asbestos identified in this contract shall be included in Tender.
- .3 Where work entails use, storage, or disposal of toxic or hazardous materials, chemicals and/or explosives, or otherwise creates a hazard to life, safety, health, or the environment; work shall be in accordance with the Authority Having Jurisdiction (AHJ).

1.30 ENVIRONMENTAL PROTECTION

- .1 Ensure that pollution and environmental control of construction activities are exercised

during the Work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

1.31 SANITATION / DECONTAMINATION PRACTICES

- .1 After each use, all disposable protective equipment shall be collected in a dedicated container for disposal.
- .2 All respiratory equipment shall be decontaminated daily after use.
- .3 All tools, pumps and equipment used during cleanup should be dedicated to the handling of contaminants and labeled as such and thoroughly decontaminated at the completion of the project.
- .4 Contaminated work clothing shall not be worn outside of regulated areas.
- .5 Workers shall wash their hands and exposed skin before eating, drinking, smoking or using toilet facilities during work shift, and at the completion of a work shift.
- .6 Food, drink and tobacco products shall not be permitted in regulated areas.

- .7 The following checklist is a general pre-construction review of the Contractor's safety program as required by the Owner.

PROJECT: _____ DATE: _____

CONTRACTOR: _____

WORK BEING PERFORMED: _____

Checkmark means YES / X means NO

- .1 ☐ Safety Policy Submitted
- .2 ☐ Safety Representative
- .3 ☐ Emergency Procedure Review
- .4 ☐ Employee Orientation
- .5 ☐ Written Safe Work Plan
- .6 ☐ Personal Protective Equipment Review
 - .1 ☐ Hard Hat & Footwear
 - .2 ☐ Safety Glasses & Hearing
 - .3 ☐ Dust & Fumes
- .7 ☐ Fall Protection
- .8 ☐ Housekeeping
- .9 ☐ Tool Box Safety Talks (Weekly)
- .10 ☐ Material Handling / Storage
- .11 ☐ Landing Platforms
- .12 ☐ WHMIS Training Verification
- .13 ☐ GFCI Requirements
- .14 ☐ Accident / Incident Investigations Notification
- .15 ☐ Verbal, Written, Gone
- .16 ☐ Joint / Worker Safety Committee
- .17 ☐ Fire Protection
- .18 ☐ Guardrails
- .19 ☐ First Aider on Staff - Name Supplied
- .20 ☐ Visitors & Safety Equipment
- .21 ☐ Task Lighting
- .22 ☐ Swampers / Riggers Competency (in writing)
- .23 ☐ Scaffolds
- .24 ☐ Elevating Work Platforms
- .25 ☐ Protruding Rebar Protection - MSDS Received
- .26 ☐ WCB Clearance Certificate.

(Print name and title)

(Print name and title)

Owner Representatives (Signature)

Contractor Representatives (Signature)

(Date)

(Date)

END OF SECTION

1 General

1.1 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Consultant.

1.5 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 SMOKING RESTRICTIONS

- .1 Smoking is not permitted on the property at any time or at any stage of construction.

1.8 ENVIRONMENTAL PERMIT APPROVAL

- .1 Comply with requirements contained in the Transportation and Public Works Environmental Management Division environmental approval permit for the project.

END OF SECTION

1 General

1.1 SITE ACCESS AND PARKING

- .1 The Consultant will designate Contractor's access to project site as well as parking facilities for equipment.
- .2 The Contractor will maintain all roads free from mud and debris tracked from construction site, on a daily basis, at no cost to Owner.
- .3 The Contractor will provide snow removal within the site during period of work as required to maintain access to building, at no cost to the Owner.
- .4 The Contractor will provide and maintain signs, barricades and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work, at no cost.
- .5 Contractor to reinstate any surface travelled upon to as found condition, or better at the end of this project.

1.2 CONTRACTOR'S SITE OFFICE

- .1 Be responsible for and provide own site office, including electricity, heat, lights and communications as listed below. Locate site office as directed by Consultant.

1.3 STORAGE SHEDS

- .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.4 LAYOUT

- .1 The Contractor will provide a bench mark and control grid.
- .2 Contractor shall be responsible for detailed setting out of his work.

1.5 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Consultant.

1.6 WASTE REMOVAL

- .1 The Contractor will provide bins as required. Contractor responsible for placement and sorting of waste in the collection bins and removal of waste from site.

END OF SECTION

1 General

1.1 INSTALLATION AND REMOVAL

- .1 Contractor to provide temporary utilities identified in this Section, in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.2 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
- .2 Filter water containing silt through geofabric prior to discharge into storm water system or water course.

1.3 WATER SUPPLY

- .1 Water supply will not be available on site. Make arrangements as required for construction.

1.4 SANITARY FACILITIES

- .1 The Contractor will provide, at no cost to the Owner, sanitary facilities for work force in accordance with governing regulations and ordinances for entire duration of project.
- .2 The Contractor will post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Sanitary facilities must be located within the limits of the Contract.

1.5 POWER

- .1 Power supply is available and will be provided for construction usage at no cost.
 - .1 Make arrangements for the use of such services through the Consultant.
 - .2 Consultant will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
 - .3 Connect to existing power supply in accordance with Canadian Electrical Code.
- .2 Provide and pay all costs to supply and install temporary cabling, panel boards, switching devices and other equipment as required to connect into power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Perform work and make all connections in accordance with the Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations and to lockout requirements specified in Section 01 35 29 - Health, Safety and Emergency Response Procedures.
- .3 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.

1.6 FIRE PROTECTION

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

END OF SECTION

1 General

1.1 INSPECTION AND DECLARATION

- .1 Contractor's Inspection:
 - .1 Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Consultant's Inspection.
- .2 Consultant's Inspection:
 - .1 Consultant, Owner and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and are fully operational.
 - .4 Certificates required by Boiler Inspection Branch have been submitted.
 - .5 Systems have been commissioned.
 - .6 Operation of systems have been demonstrated to Owner's personnel.
 - .7 Work is complete and ready for Final Inspection.
- .4 Final Inspection:
 - .1 When items noted above are completed, request final inspection of Work by Owner and Consultant. If Work is deemed incomplete by Consultant complete outstanding items and request re inspection.
- .5 Declaration of Substantial Performance:
 - .1 When Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article for specifics to application.
- .6 Commencement of Lien and Warranty Periods:
 - .1 Date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
 - .1 When Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2. If Work is deemed incomplete by Owner, complete outstanding items and request re inspection. Cost of re inspection will be deducted from final payment.
- .8 Payment of Holdback:
 - .1 After issuance of Certificate of Substantial Performance of Work, submit an application of payment of holdback amount in accordance with CCDC2.

1.2 CERTIFICATE OF SUBSTANTIAL PERFORMANCE

- .1 Upon approval, a Certificate of Substantial Performance will be issued to the Owner by the Consultant with a copy delivered to the Contractor. This Certificate will take the form shown in Section 01 77 00 - Closeout Procedures.
- .2 The Certificate of Substantial Performance will establish the date of the Consultant's inspection as the date of Substantial Performance of the Contract, and will commence

- the required 60-day period before release of the lien holdback amount.
- .3 During the 60-day period, Contractor shall continue to complete the work.
- .4 The Contractor shall immediately deliver to the Consultant specified submissions upon receipt of the Certificate of Substantial Performance.

1.3 ESTABLISHMENT OF WARRANTIES

- .1 Warranties shall commence at date of Substantial Performance of the Work.

1.4 CERTIFICATE FOR PAYMENT OF LIEN HOLDBACK AMOUNT

- .1 The Contractor shall submit statement and supporting documents for application of Release of Lien Holdback amount. These documents include those listed in Paragraph 2.2.2 and 2.2.3 and the Statutory Declaration Form CCDC 9A.
- .2 Within five working days of receipt of application for Release of Lien Holdback amount and if approved, the Consultant will prepare a Certificate for Payment of the Lien Holdback amount. This Certificate dated on the day following termination of the 60 day period will be issued to the Owner with a copy delivered to the Contractor.
- .3 The Owner will before the date of this Certificate ensure that no liens related to the Contract are registered and that no notice of liens has been received at the end of the 60-day period.
- .4 Should no liens exist, the Lien Holdback will be due and payable one day after termination of the 60-day period in the amount indicated on the approved application for Certificate of Substantial Performance.
- .5 The Owner will review jointly with the Contractor's Insurance related to the Contract before the 60-day period is terminated to ensure that all parties are adequately covered.

1.5 TOTAL PERFORMANCE

- .1 The Contractor shall inspect the work to establish its completion in accordance with the Contract Documents and when satisfied of this completion request of the Consultant a final inspection.
- .2 The Consultant will compile a final deficiency list at this inspection and issue it to the Contractor and Owner.
- .3 The Contractor shall correct final deficiencies before a date agreed upon by the Contractor and Consultant.
- .4 When the Contractor has satisfied himself that these corrections have been completed in a satisfactory manner by his inspection, he shall schedule a re-inspection by the Consultant, and the Owner's representatives if required, within five working days of the Contractor's request.
- .5 When the Consultant is satisfied that all deficiencies have been rectified and the work is complete, the Contractor shall submit an application for the final progress payment.
- .6 When "seasonal deficiencies", as determined by the Owner and/or Consultant exist, a sum of money will be withheld in accordance with the requirements of CCDC2-GC5.8.

1.6 WARRANTY PERIOD

- .1 The Owner will advise the Consultant of defects observed during Warranty periods.
- .2 The Consultant will notify the Contractor of these defects and request him to remedy the defects in accordance with the Contract Documents.
- .3 Thirty days before expiration of Warranties the Owner's representatives, the Consultant and the Contractor will review the work as arranged by the Contractor noting defects of products and workmanship.
- .4 The Contractor shall immediately remedy such noted defects.

1.7 CERTIFICATE

.1 CONTRACTOR: _____

PROJECT: _____

DATE OF SUBSTANTIAL PERFORMANCE: _____

.1 Substantial Performance Inspection for above described work was carried out
_____ (date) by:

.1 For Owner _____

.2 For Consultant _____

.3 For Contractor _____

.2 The items which are not in accordance with the Plans and Specifications and require correction under the Conditions of the Contract Agreement are listed as an attachment to this Document.

CONTRACTOR'S CERTIFICATION

I hereby Certify that the work has been executed in accordance with the Plans and Specifications with the exception of deficiencies listed herewith. The undersigned hereby agrees that notwithstanding the generality of the foregoing, the acceptance of the works shall not prejudice any rights of the Owner or affect any liabilities of the undersigned Contractor pursuant to the provisions of the Contract.

Contractor Date

OWNER'S ACCEPTANCE

I hereby accept the work on behalf of the Owner providing that the deficiencies listed herewith are completed. This acceptance is not to be construed as relieving the Contractor from the responsibility to correct other defects in the work, whether latent or patent, as may become apparent within the guarantee/warranty period. This acceptance is made without prejudice to the rights of the Owner or to the liabilities of the Contractor which may arise and/or continue after acceptance of the work.

Owner Date

CONSULTANT'S DECLARATION

Based on periodic visits to the job site and general familiarity with the progress of the work, I declare that, to the best of my knowledge, information and belief, construction is proceeding in accordance with the intent of the design and in general compliance with the plans and specifications, with the exception of the deficiencies listed herewith.

Consultant Date

1.8 DEFICIENCIES

- .1 The following is a list of deficiencies to be corrected. This acceptance is not to be construed as relieving the Contractor from the responsibility of correcting other defects in the work as may become apparent during the Guarantee/Warranty Period.

- .1 _____
.2 _____
.3 _____

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Project Record Documents as follows:
 - .1 As-Built drawings;
 - .2 As-Built specifications;
 - .3 Reviewed shop drawings.
- .2 Operations and Maintenance data as follows:
 - .1 Operations and Maintenance Manual;
 - .2 Maintenance Materials;
 - .3 Spare Parts;
 - .4 Special Tools.

1.2 PROJECT RECORD DOCUMENTS

- .1 Consultant will provide two white print sets of contract drawings and two copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Consultant at any time during construction.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of project and prior to interim inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Consultant. All drawings of both sets shall be stamped "As-Built Drawings" and be signed and dated by Contractor.
 - .2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
 - .3 Record following information:
 - .1 Location of all services, including size, depth, alignment, valving locations, utilities and appurtenances etc.
 - .2 Field changes of dimension and detail;
 - .3 Location of all capped or terminated services and utilities.
 - .4 Chases for electrical and other services;
 - .5 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
- .5 As-built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
 - .2 Changes made by Addenda and Change Orders.
 - .3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.
- .6 Maintain As-built documents current as the contract progresses. Consultant will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Consultant's discretion. Failure to maintain as-builts current and complete to satisfaction of the Consultant shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.3 REVIEWED SHOP DRAWINGS

- .1 Compile full set of shop drawings and product data reviewed on project and incorporate into Operations and Maintenance Manual. Supply number of shop drawing sets equal to the required number of final Operations and Maintenance manuals.
- .2 Submit shop drawing sets at same time and as part of the contents of the Operation and Maintenance manuals specified in this section.

1.4 OPERATIONS AND MAINTENANCE MANUALS

- .1 Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.
- .2 Manual Language: final manuals to be in English language.
- .3 Number of copies required:
 - .1 Submit 2 draft copies of the manual for review and inspection by Consultant. Make revisions and additions as directed and resubmit.
 - .2 Upon review and acceptance by Consultant, submit 3 final copies. Initial copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Consultant 3 weeks prior to application for Interim Certificate of Completion of project.
- .5 Binding:
 - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
 - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
 - .3 Where multiple binders are needed, correlate data into related consistent groupings.
 - .4 Identify contents of each binder on spine.
 - .5 Material: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each separate product or system within each section and with typed description of product and major component parts of equipment.
 - .6 Type lists and notes. Do not hand write.
 - .7 Drawings, diagrams and manufacturers' literature must be legible, determined solely by the Consultant. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .6 Manual Contents:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Contractor, and all Sub-contractors.
 - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .3 List of maintenance materials.
 - .4 List of spare parts.
 - .5 List of special tools.
 - .6 Original or certified copy of Warranties and Guarantees.
 - .7 Copies of approvals, and certificates issued by Inspection Authorities.
 - .8 Copies of reports and results from tests designated as Contractor's responsibilities.
 - .9 Product Information Data on all materials, equipment and systems as specified

in individual sections of the specifications to include:

- .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
- .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
- .3 Parts list.
- .4 Installation details.
- .5 Operating instructions.
- .6 Maintenance instructions for equipment.
- .7 Maintenance instructions for finishes.
- .7 Shop drawings:
 - .1 Bind one complete set of reviewed shop drawings into each copy of operations and maintenance manual.
 - .2 Bind the shop drawings in a manner such that they correspond with the specification section they relate to.
 - .3 Where large quantity of data is supplied due to size of project, fold and bind professionally into separate correctly sized binder.
- .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
 - .1 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 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed color coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include seasonal and any special operating instructions.
 - .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Servicing and lubrication schedule, and list of lubricants required.
 - .7 Manufacturer's printed operation and maintenance instructions.
 - .8 Sequence of operation by controls manufacturer.
 - .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .10 Provide installed control diagrams by controls manufacturer.
 - .11 Provide Contractor's coordination drawings, with installed color coded piping diagrams.
 - .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .14 Include test and balancing reports.
 - .15 Additional requirements as specified in individual specification sections.

1.5 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

- .1 Provide spare parts, special tools and extra materials for maintenance purposes in

- quantities specified in individual specification sections.
- .2 Tag all items with associated function or equipment.
- .3 Provide items of same manufacture and quality as items in Work.
- .4 Deliver to site in well packaged condition. Store in location as directed by Consultant.
- .5 Clearly mark as to contents indicating:
 - .1 Part number.
 - .2 Identification of equipment or system for which parts are applicable.
 - .3 Installation instructions or intended use as applicable.
 - .4 Name, address and telephone number of nearest supplier.
- .6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.
- .7 Turnover to Facility Manager and obtain signature. Include receipt with Maintenance Manual.

1.6 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 site; place and store.
- .4 Receive and catalog all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.7 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with Consultant's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, two (2) final hard copies and one (1) electronic final copy of operating and maintenance manuals in English.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.
- .9 Failure to deliver maintenance materials, spare parts, special tools and as-builts will delay progress payments.

1.8 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm 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.

1.9 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 date of submission; names,
 - .2 addresses, and telephone numbers of Consultant 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 and Section 01 77 00 - Closeout Procedures.
- .6 Training: Refer to Section 01 91 13 - General Commissioning Requirements.

1.10 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on 2 sets of white print, opaque drawings, and in copy of Project Manual.
- .2 Provide felt tip marking pens, maintaining separate colors 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 catalog 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, required by individual specifications sections.

1.11 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 Consultant.

1.12 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 where specifically requested by individual specification sections, 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

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.1-18, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
 - .2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .3 CSA Z462-12, Workplace Electrical Safety.
- .2 Institute of Electrical and Electronics Engineers (IEEE) / National Electrical Safety Code Product Line (NESC).
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standard Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical terms used in electrical specifications and on electrical drawings are those defined by IEEE SP1122.

1.3 CARE, OPERATION AND START-UP

- .1 Instruct Consultant and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .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, maintenance, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment or component failure.
 - .5 Other items of instruction as recommended by manufacturer of the system or equipment.
- .3 Print operating instructions in laminated plastic adjacent to equipment or systems interface.
- .4 Arrange and pay for manufacturer's factory service technician to supervise start-up, installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .5 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 all aspects of its care and operation.

1.4 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235-83(R2000).
- .2 Control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 SITE VISIT

- .1 Prior to tender submission visit the site and become familiar with the job and all conditions which may affect the overall cost. Ignorance of existing conditions will not be considered as basis for extra claims. Refer to Division 01 - General Requirements for additional information.

1.6 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.

- .1 Submit shop drawings for all electrical equipment unless otherwise indicated.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, wiring, accessories and other items that must be shown to ensure coordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 If changes are required, resubmit corrected shop drawings.
- .2 Manufacturer's Field Reports: submit to Consultant within 7 days of review, verifying compliance of work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
- .3 Submit WHMIS MSDS information in accordance with Division 01 - General Requirements.
- .4 Upon completion of work submit As-Built Drawings, Maintenance Manuals, and Submittals in accordance with Division 01 - General Requirements.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Division 01 - General Requirements.
- .2 All electrical work is to be carried out by qualified, licensed electricians or apprentices for the province of Prince Edward Island and the electrical contractor must have a valid contractor license issued by the province of Prince Edward Island.
 - .1 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 The Consultant reserves the right to approve the quality of material and workmanship, and to call for any tests which they deem necessary to establish the integrity of the installation during the progress of the work and a complete test of each system at the completion of the work. The cost of such tests are not to be considered as extras.
- .4 Health and Safety: in accordance with Division 01 - General Requirements.
 - .1 Protect exposed live equipment during construction for personnel safety.
 - .2 Shield and mark all live parts "LIVE 120 VOLTS", or with appropriate voltage in English.
 - .3 Arrange for installation of temporary barriers for open trenches or enclosures containing electrical distribution equipment.
- .5 Quality Control: in accordance with Division 01 - General Requirements.
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to the authority having jurisdiction for approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Upon completion of work, submit load balance report as described in PART 3 - LOAD BALANCE.
 - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of work to Consultant.

1.8 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay all associated fees.
- .3 Notify Consultant of changes required by Electrical Inspection Division prior to making changes.
- .4 Submit Certificates of Acceptance from Electrical Inspection Division or authorities

having jurisdiction on completion of work to Consultant.

1.9 CO-ORDINATION

- .1 Co-ordinate all work with work of other divisions to avoid conflict and notify Consultant if any changes are required.
- .2 Locate electrical systems, equipment, and materials to provide minimum interference between new and existing electrical equipment.
- .3 Contractor to locate and coordinate within all existing underground services before commencing work and be responsible for any damages caused by failure to coordinate with and preserve underground services.
- .4 Where interference occurs, the Consultant must approve relocation of equipment and materials regardless of installation order.
- .5 Notwithstanding the review of shop drawings, the Electrical Contractor may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination of the Electrical Contractor with other trades. The cost of this relocation will be the responsibility of the Electrical Contractor and the Consultant will determine the extent of relocation required.
- .6 Leave space clear, and install equipment to accommodate future materials and/or equipment as indicated or specified, or to accommodate equipment and/or materials supplied by other Contractors.
- .7 Verify that the spaces in which the equipment is to be installed is sufficient and install all equipment to maintain clearances, to conserve space, comply with codes, and to ensure adequate space for future servicing.
- .8 The Drawings for the Electrical work are diagrammatic performance Drawings only and are intended to convey the scope of work and indicate the general arrangement, locations, and size of equipment, outlets, etc. The Drawings do not show Mechanical or Civil details.
- .9 Do not scale or measure Drawings, but obtain information regarding accurate dimensions, from the dimensions shown on the Civil Drawings or by site measurements. Follow the Electrical Drawings for laying out the work.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Provide Consultant with material delivery schedule within two weeks after award of Contract.
- .2 Arrange for delivery access and unloading and/or storage areas with General Contractor.

1.11 INSPECTION OF WORK

- .1 Periodic visits to the site during construction phase will take place to ascertain reasonable conformity to plans and specifications. The Contractor will be responsible for the execution of their work in conformity with the construction documents, the Contract, and the requirements of the inspection authority.

1.12 SCHEDULING OF WORK

- .1 Work is to be scheduled as described in Division 01 - General Requirements.
- .2 Become familiar with the scheduling requirements for the work and comply with these conditions.
- .3 No additional monies will be paid for Contractor's requirement to comply with work schedule conditions.
- .4 Note that the Departmental Representative intends to carry on business as usual throughout Cabot Beach Park and work activities must be coordinated to minimize disruption throughout the site. Provide any required temporary work.
- .5 All power shutdowns which affect Cabot Beach Park operation must have prior approval of Departmental Representative and must be scheduled in writing at least 48 hours in

advance with the Project Manager.

- .6 Overtime work, and work outside normal work hours deemed necessary to meet the schedule are the responsibility of the Contractor and must meet the requirements of the PEI Employment Standards Act. All costs resulting from such overtime work must be included in the Contractor's total tender price.

2 Products

2.1 PRIOR APPROVAL OF PRODUCTS

- .1 The use of any product not listed by name in the specification must be approved by Consultant prior to tender submission.
- .2 By using pre-approved product substitutions the Contractor accepts the responsibility and associated costs for all required modifications to circuitry, devices and wiring. The Contractor is to submit shop drawings with deviation from the original design highlighted to the Consultant for review and approval prior to rough-in.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Division 01 - General Requirements.
- .2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division prior to delivery and submit such approval as described in Part 1 - Submittals.

2.3 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.

2.4 WARNING SIGNS

- .1 As specified and to meet requirements of Electrical Inspection Department.
- .2 Porcelain enamel or acrylic decal signs, minimum size 175 x 250 mm.

2.5 WIRING TERMINATIONS

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

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white 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 line	6 mm high letters

- .2 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

- .3 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate and label.
- .5 Identification to be English.
- .6 Nameplates for pull boxes and panelboards to indicate system name, overcurrent protection device rating, voltage, phase, and number of wire, and power source.
- .7 Nameplate for transformers to indicate capacity, primary and secondary voltages and transformer number.
- .8 Lamicoid nameplate installed on panelboards shall indicate the following:
 - .1 Designated name of equipment.
 - .2 Voltage, number of phases and wires.
 - .3 Designation of power source.
 - .4 The following is an example:

DISTRIBUTION PANEL 'DP #3' 120/240V - 1PH - 3W
FED FROM STEPDOWN TRANSFORMER 'TX-3'

2.7 WIRING IDENTIFICATION

- .1 Identify wiring with indelible pre-printed self-adhesive vinyl tape, indicating panel and circuit number. Wiring to be identified at both ends and at junction, pull boxes and splices.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1-18, Canadian Electrical Code.

3 Execution

3.1 NAMEPLATES AND LABELS

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

3.2 LOCATION OF EQUIPMENT

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

3.3 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.4 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program will be permitted, under the direct supervision of a qualified licensed electrician.
 - .1 Permitted activities are to be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.
- .3 Load Balance:
 - .1 Measure phase current to panelboard with normal loads (site services) 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 Submit, at completion of work, report listing phase and neutral currents on panelboards, pad mount transformers and operating under normal load. State hour and date on which each load was measured, and voltage at time of test.
- .4 Conduct and pay for following tests in accordance with Division 01 - General Requirements.
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Ground system continuity and resistance test.
- .5 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .6 Insulation resistance testing for:
 - .1 Megger and record circuits, incoming service feeders and wiring to distribution panels up to 350 V with a 500 V instrument.
 - .2 Check resistance to ground before energizing and record value.
- .7 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

3.5 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.

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

- .1 Work of this Section consists of modifying electrical distribution equipment including, but not limited to:
 - .1 The removal and reinstatement of existing 50 KVA stepdown pad mount transformer as required to accommodate service upgrades and distribution system reconfiguration. All high voltage cabling and termination work to be completed by the local utility (Maritime Electric Company Limited). Coordinate all temporary power and site disruptions with the Owner.
- .2 All removal or alteration work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Division 01 - General Requirements.

1.4 SITE SURVEY

- .1 Prior to Tender submission, visit the site and survey and quantify the extent of the removals/alterations required for this contract and include for all costs in the total tendered price. Any existing conditions information indicated on the drawings is for general guidance only.
- .2 In conjunction with site visit, review all drawings and include all costs due to existing conditions in total tendered price.

1.5 PROTECTION

- .1 The Contractor is to provide and coordinate the protection of existing infrastructure and systems which may be damaged by work activities and is to be responsible for any damages to existing structures or systems as a result of lack of coordination and/or protection.

1.6 SALVAGE MATERIAL

- .1 Existing equipment and devices designated for reuse are to be removed, stored, cleaned and re-installed as indicated on the drawings.
- .2 Identify any damaged equipment or materials intended for reuse prior to demolition and point out deficiencies to the Consultant at that time.

2 Products

2.1 NOT APPLICABLE

- .1 Not Applicable.

3 Execution

3.1 GENERAL REMOVALS

- .1 Coordinate work of this Section with other trades.
- .2 Schedule all removal work with the Departmental Representative. Do not disrupt Cabot Beach Park operations except as permitted by the Schedule.
- .3 Any existing conduit, wiring, boxes or equipment that is to remain in service is to be

properly supported and operate in a safe and reliable manner as required by the Canadian Electrical Code.

- .4 Make alterations to existing electrical services as required and make good all circuits affected by the renovations.
- .5 Any existing electrical circuits and/or equipment that are interrupted during construction to accommodate alterations but are to remain in service are to be reconnected and circuits made good.
- .6 Any relocating of existing equipment and any rerouting of existing wire and conduit to coordinate with new work to be included in total tendered price.

3.2 IDENTIFICATION OF EXISTING CIRCUITS AND EQUIPMENT

- .1 Provide identification indicating circuit and panel number at all new and existing wiring devices in renovated area.
- .2 Provide equipment nameplates and labels for all new and existing equipment.
- .3 Equipment identification, wiring identification and conduit and cable identification is to be in accordance with Section 26 05 00 - Common Work Results - Electrical.

3.3 CLEANING

- .1 Reused existing equipment to be cleaned and in accordance with Division 01 - General Requirements.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65-93 (R2008), Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required. Use twist-on connectors for #14 AWG to #8 AWG conductors.
- .2 Compression type connectors for connecting #6 AWG conductors and larger, unless indicated otherwise.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for stranded round copper or aluminum conductors.
 - .2 Clamp for stranded round copper or aluminum conductors.
 - .3 Stud clamp bolts for copper or aluminum conductors.
 - .4 Bolts for copper bar.
 - .5 Sized for conductors and bars as indicated.
- .4 Clamps or connectors for Teck cable as required to: CAN/CSA-C22.2 No.18.

3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation is to meet secureness tests in accordance with CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.
 - .4 Where ACM conductors are used, apply zinc joint compound on aluminum conductors prior to installation of connectors or termination.
 - .5 Install crimp style connectors with snap-on nylon caps on splices and joints on branch circuits.
- .2 All connections are to be made electrically and mechanically secure. Size and type of connector to be in accordance with manufacturers recommendations for each wire size and combination of wires.

3.2 RESTRICTIONS

- .1 Circuit splices are NOT permitted in equipment enclosures or electrical panelboards.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors (0-1000V).
- .3 Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .5 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 03-96, Test Methods for Electrical Wires and Cables.
 - .2 CAN/CSA C22.2 No. 131, Type TECK 90 Cable.

2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for #8 AWG and larger.
- .2 Conductors to be sized as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated. Provide RWU90 XLPE rated cable for underground wiring including feeders and site circuits.
- .3 Single conductor metal sheathed cables are not permitted.
- .4 Conductor sizes on drawings are based on copper conductors, unless specifically indicated otherwise.
 - .1 ACM conductors are not to be terminated with copper bodied connectors, and all ACM conductor ends are to be treated with an oxide retardant coating prior to termination.

2.2 TECK CABLE

- .1 Cable: to CAN/CSA C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper or ACM alloy, size as indicated.
- .3 Insulation:
 - .1 Chemically cross-linked polyethylene (XLPE), rated RW90, 600 V, suitable for direct burial.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 1500 mm centers.
- .8 Connectors:
 - .1 Watertight spin-on style connectors or type approved for TECK cable.
 - .1 Acceptable material:
 - .1 Thomas & Betts - Star Teck.

2.3 ACM CONDUCTORS

- .1 Annealed, compacted aluminum alloy conductor material (ACM), multi-conductor, 600 V

- insulation.
- .2 Type: TECK90.
- .3 Armour: interlocked aluminum strip.
- .4 Conductivity: 61% IACS to that of copper.
- .5 Outer jacket: ACWU90, PVC jacket, FT4 rated suitable for direct burial.

3 Execution

3.1 GENERAL CABLE INSTALLATION

- .1 Install cable in trenches in accordance with Section 33 71 73.02 - Underground Electrical Service.
- .2 Support cables in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .3 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0-1000 V).
- .4 Conductor length for parallel feeders to be identical.
- .5 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

3.2 INSTALLATION OF TECK CABLE

- .1 Install Teck cables where indicated.
 - .1 Group cables wherever possible on channels.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.3 INSTALLATION OF ACM CONDUCTORS

- .1 Install ACM cables as per CSA 22.1-18 and manufacturers installation requirements.
- .2 Do not terminate ACM conductors with a copper bodied connector.
- .3 Apply oxide coating on base cables as per CSA 22.1-18 requirements.

3.4 RESTRICTIONS

- .1 Splices in wire and cable #6 AWG and larger are not permitted, unless written approval is provided by Consultant.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.0.4, Bonding and Grounding of Electrical Equipment (Protective Grounding).

2 Products

2.1 MATERIALS

- .1 Rod or plate electrodes as indicated.
 - .1 Rod electrodes: copper clad steel, 19 mm dia. by 3 m long.
 - .2 Conductors: bare, stranded, un-tinned soft annealed copper wire, size as indicated for ground bus, electrode interconnections, metal structures, transformers, switchgear, motors and ground connections.
 - .3 Conductors: PVC insulated coloured green, stranded un-tinned soft annealed copper wire, size as indicated for grounding cable sheaths, raceways, pipe work, potential transformers, equipment enclosures, etc.
 - .4 Accessories: non-corroding, necessary for complete grounding system, type, size material as indicated, including:
 - .1 Grounding and bonding bushings,
 - .2 Protective type clamps,
 - .3 Bolted type conductor connectors,
 - .4 Bonding jumpers, straps,
 - .5 Pressure wire connectors.

3 Execution

3.1 GROUNDING INSTALLATION

- .1 Install continuous grounding system including, electrodes, conductors, connectors and accessories in accordance with CSA C22.2 No.0.4 and requirements of local authority having jurisdiction.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to electrodes, structural steel work, using copper welding by thermit process.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Use tinned copper conductors for aluminum structures.
- .7 Do not use bare copper conductors near un-jacketed lead sheath cables.

3.2 ELECTRODE INSTALLATION

- .1 Install ground rod as indicated. Make grounding connections to service equipment.
- .2 Make special provision for installing electrodes that will give acceptable resistance to

ground value, where rock or sand terrain prevails.

3.3 EQUIPMENT GROUNDING

- .1 Install grounding connections to non current carrying parts of transformers, circuit breakers, enclosures, current transformers, cable sheaths, raceways, pipe work, etc.
- .2 Ground hinged doors to main frame of electrical equipment enclosure with flexible jumper.

3.4 NEUTRAL GROUNDING

- .1 Connect transformer neutral and distribution neutral together using a 600 V green insulated conductor and ensure distribution neutral is not bonded directly to main ground bus.
- .2 Interconnect electrodes and neutrals at each grounding installation.
- .3 Connect neutral of service transformer to main neutral bus with tap of same size as secondary neutral.

3.5 CABLE SHEATH GROUNDING

- .1 Bond single conductor, metallic sheathed cables together at one end only. Break sheath continuity by inserting insulating sleeves in cables.
- .2 Use # 6 AWG flexible copper wire soldered, not clamped, to cable sheath.
- .3 Connect bonded cables to ground with # 2/0 AWG copper conductor.

3.6 FIELD QUALITY CONTROL

- .1 Perform earth loop test and resistance tests using method appropriate to site conditions and to approval of local authority having jurisdiction.
- .2 Perform test before energizing electrical system.
- .3 Engage testing agent to inspect grounding and perform resistance test before backfill.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results - Electrical.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)
 - .1 ANSI/IEEE 837-1989 (R1996), Qualifying Permanent Connections Used in Substation Grounding.

2 Products

2.1 EQUIPMENT

- .1 Rod electrodes: copper clad steel 19 mm dia by 3 m long.
- .2 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .3 Insulated grounding conductors: green, type RW90, copper, size as indicated.
- .4 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, as required by local authority having jurisdiction.
 - .4 Bonding jumpers, straps.
 - .5 Pressure wire connectors.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, and accessories.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to electrodes, using mechanical bolt type connectors.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install a bonding wire in all conduits.
- .8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .9 Ground secondary service pedestals.

3.2 ELECTRODES

- .1 Install electrodes and make grounding connections.
- .2 Bond separate, multiple electrodes together.
- .3 Use copper conductors for connections to electrodes as required by Section 10 of the Canadian Electrical Code.
- .4 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.3 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of primary 7.2 KV system, secondary 240 V system.

3.4 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Transformers, distribution panels, pedestals, etc.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 18.4-04 (R2009), Hardware for the support of Conduit, Tubing, and Cable (Bi-National Standard with UL 2239).

2 Products

2.1 SPECIFIC PURPOSE SUPPORTS

- .1 Specific purpose heat treated, steel fasteners to support boxes, conduit and cable from structure, and channels.
 - .1 Fasteners and supports exposed to outdoor elements to be stainless steel or plastic coated to mitigate deterioration.

3 Execution

3.1 INSTALLATION

- .1 Secure surface mounted equipment to wooden enclosure and pressure treated wooden post.
- .2 Fasten exposed conduit or cables to cabinet construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Strap Teck cable at box location and at every 900 mm.
- .3 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .4 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .5 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .6 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.2 RESTRICTIONS

- .1 Do not use wire lashing or nylon or plastic strap ('Ty-Wraps') to support or secure raceways or cables.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .2 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
 - .3 CSA C22.2 No. 211.2 (R2011), Rigid PVC (Unplasticized) Conduit.
 - .4 CSA C22.2 No. 18.3-12, Conduit, Tubing, and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 & UL 514B).

1.2 SUBMITTALS

- .1 Provide shop drawings and product data in accordance with Division 01 - General Requirements.

1.3 LOCATION OF CONDUITS

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

2 Products

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with steel set-screw couplings and connectors.
- .2 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .3 Flexible metal conduit: to CSA C22.2 No. 56, aluminum flexible metal.
- .4 Flexible PVC conduit: to CAN/CSA-C22.2 No. 227.3.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- .2 Channel type supports for two or more conduits spaced every 1.5 m on center.
- .3 Fasteners, supports and straps exposed to outdoor elements to be stainless steel epoxy or plastic coated to mitigate deterioration.

2.3 CONDUIT FITTINGS

- .1 Fittings: To CAN/CSA C22.2 No. 18.3, manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90° bends are required for 25 mm and larger conduits, unless indicated otherwise.
- .3 Ensure conduit bends other than factory "ells" are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends is not permitted.
- .4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion to suit installation and 19 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

- .1 Polypropylene.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the certification of the components.
- .2 Use rigid PVC conduit underground.
- .3 Minimum conduit size for conduit is 27 mm.
- .4 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .5 Install fish cord in empty conduits.
- .6 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .7 Dry conduits out before installing wire.

3.3 CONDUITS UNDERGROUND

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

3.4 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 31 23 00 - Excavation and Fill.

1.2 REFERENCES

- .1 Canadian Standards Association, (CSA)
- .2 Insulated Cable Engineers Association, Inc. (ICEA)

2 Products

2.1 CABLE PROTECTION

- .1 38 x 140 mm planks pressure treated with copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

2.2 MARKERS

- .1 Wooden post type markers: 89 x 89 mm, 1.5 m long, pressure treated with copper naphthenate or 5% pentachlorophenol solution, water repellent preservative, with nameplate fastened near post top, on side facing cable or conduit to indicate depth and direction of duct and cable runs.
 - .1 Nameplate: aluminum anodized 89 x 125 mm, 1.5 mm thick mounted on cedar post with mylar label 0.125 mm thick with words Cable, Joint or Conduit with arrows to indicate change in direction.

2.3 MARKER TAPE

- .1 Metal detectable polyethylene marker tape: 75 mm wide for direct burial.
- .2 Marker tape to be red in colour with the words "CAUTION ELECTRIC LINE BURIED BELOW" in large black letters.

2.4 SEALANT

- .1 Low VOC mastic compound.
 - .1 Acceptable material:
 - .1 DS-321.
 - .2 Flex Grip.
 - .3 Kingco 11-600.

3 Execution

3.1 DIRECT BURIAL OF CABLES

- .1 After sand bed specified in Section 31 23 00 - Excavation and Fill, is in place, lay cables maintaining 75 mm clearance from each side of trench to nearest cable. Do not pull cable into trench.
- .2 Provide offsets for thermal action and minor earth movements. Offset cables 150 mm for each 60 m run, maintaining minimum cable separation and bending radius requirements.
- .3 Make termination and splice only as indicated leaving 0.6 m of surplus cable in each direction.
 - .1 Make splices and terminations in accordance with manufacturer's instructions using approved splicing kits.
- .4 Underground cable splices not acceptable unless written approval is provided by Consultant.

- .5 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.
- .6 Cable separation:
 - .1 Maintain 75 mm minimum separation between cables of different circuits.
 - .2 Maintain 300 mm horizontal separation between low and high voltage cables.
 - .3 When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position.
 - .4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables.
 - .5 Install treated planks on lower cables 0.6 m in each direction at crossings.
- .7 After sand protective cover specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling, is in place, install continuous row of overlapping 38 x 140 mm pressure treated planks as indicated to cover length of run.

3.2 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
 - .1 Do not pull spliced cables inside ducts.
- .2 Install multiple cables in duct simultaneously.
- .3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .4 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- .5 Pull mandrel through and clean each section of conduit prior to installation.
- .6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

3.3 MARKER TAPE

- .1 Install marker tape 300 mm below grade as indicated, continuous over full length of cables and ducts.

3.4 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests for secondary wiring to distribution panels.
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .2 Ground shields, ground wires, metallic armour and conductors not under test.
 - .3 Leakage Current Testing.
 - .1 Raise voltage in steps from zero to maximum values as specified by manufacturer for type of cable being tested.
 - .2 Hold maximum voltage for specified time period by manufacturer.

- .3 Record leakage current at each step.
- .7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test. Include results in Commissioning Manual.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for standard breaker type panelboards.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results - Electrical.
- .2 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.29, Panelboards and enclosed Panelboards.

1.4 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.
- .2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity, interrupting capacity, incoming feeder location, and enclosure dimensions.

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.
- .2 240 V panelboards: bus and breakers rated for 10,000 A (symmetrical) minimum interrupting capacity respectively or as indicated on electrical drawings.
 - .1 Where new circuit breakers are installed in existing distribution panelboard 'DP #1", the minimum interrupting capacity of the new circuit breakers is to match the minimum interrupting capacity of the existing panelboard and associated circuit breakers.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Two keys for each panelboard and key panelboards alike.
- .6 Tin plated aluminum bus with neutral of same ampere rating as mains. Panelboards are to be supplied fully bussed.
- .7 Mains: suitable for bolt-on breakers.
- .8 Trim and door finish: baked grey enamel with concealed front bolts and hinges.
- .9 Minimum tub width of 500 mm.

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 bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Nameplate for each panelboard size 4 engraved as indicated.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit.

2.4 MANUFACTURERS

- .1 Acceptable material:
 - .1 Schneider.
 - .2 Siemens.
 - .3 Cutler-Hammer.

3 Execution

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.
- .3 Mount panelboards to 60" to center, measured from finished grade.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.
- .6 Balance phase loading and complete testing in accordance with Section 26 05 00 - Common Work Results - Electrical.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.55, Special Use Switches.
 - .4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.3 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.

2 Products

2.1 POWER OUTLET PANELS

- .1 Integrated power distribution and outlet panel to be c/w receptacles and overcurrent protection with a single CSA type 3R, gray baked enamel, galvanized steel enclosure, and lockable cover.
- .2 Power outlet panel to be mounted to pressure treated post as indicated on the Drawings.
- .3 Unit to be c/w receptacle configuration to Section 2.2 and as follows:
 - .1 One (1) CSA 14-50R single receptacle.
 - .2 One (1) ANSI 73.13 TT-30 single receptacle.
 - .3 One (1) CSA 5-20R duplex receptacle.
- .4 Circuit breaker overcurrent protection to be ground fault protected as required by CSA 22.1-18 and as indicated in Specification Section 26 28 16.02 - Moulded Case Circuit Breakers.
- .5 Provide a size 3 lamicoid nameplate on each power outlet panel inside face of power outlet panel identifying site number, and source circuit to Specification Section 26 05 00 - Common Work Results - Electrical.
- .6 Acceptable material:
 - .1 Schneider #PAK 75CTGFI

2.2 RECEPTACLES

- .1 Duplex receptacles, CSA type as indicated, U ground, to: CSA-C22.2 No.42 with following features:
 - .1 Black thermoplastic moulded housing.
 - .2 Suitable for # 10 AWG conductor for side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
 - .6 Commercial specification grade.
 - .7 Acceptable material:
 - .1 Standard Duplex, CSA type 5-20 R:
 - .1 Cooper #CR20BK.

- .2 Hubbell #CR20BK.
 - .3 Leviton #CR20BK.
 - .4 Pass & Seymour #PS5262W.
- .2 Single receptacle, CSA type as indicated, to CSA-C22.2 No. 42 with the following features:
 - .1 Black thermoplastic moulded housing.
 - .2 Suitable for back and side wiring.
 - .3 Acceptable material:
 - .1 Single, CSA 14-50R (240V, 50A, 3W+G) & ANSI 73.13 (120V, 30A, 2W +G):
 - .1 Cooper #CW1450R
 - .2 Hubbell #HBL 9450A
 - .3 Leviton #279
 - .4 Pass & Seymour #3894
- .3 Receptacles of one manufacturer throughout project.

3 Execution

3.1 INSTALLATION

- .1 Receptacles:
 - .1 Mount at height as indicated on Drawings.
 - .2 Do not use back entrances for connecting wiring devices to circuits. Wrap conductors around screw terminals and tighten. Tighten all unused screw terminals.
 - .3 Connect incoming feeder to overcurrent protection and overcurrent protection to wiring device. Power outlet panel to be installed and wired in accordance with manufacturer's instructions.

3.2 TESTING

- .1 All receptacles to be tested for voltage drop and results recorded where branch circuit voltage drop exceeds 3% from branch circuit panelboard to the point of utilization, in accordance with the Canadian Electrical Code, branch circuit wiring will have to be modified to meet the 3% requirement unless otherwise approved by the Authority Having Jurisdiction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE)
 - .1 ANSI/IEEE C37.13, Low Voltage AC Power Circuit Breakers Used in Enclosures.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 5, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.3 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 - General Requirements.
 - .1 Include time-current phase protection co-ordination characteristic curves for breakers with ampacity 100 A and over or breakers with interrupting capacity of 22,000 A (symmetrical) and over at system voltage.

2 Products

2.1 MOULDED BREAKERS GENERAL

- .1 Moulded-case circuit breakers, to CSA C22.2 No. 5.
- .2 Bolt-on moulded-case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40 deg. C ambient.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 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. Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
- .5 Breakers are to be protected by a ground fault circuit interrupter in accordance with CSA 22.1-18, Article 72-110.
- .6 Breakers are to be by the same manufacturer as the panelboard in which they are being installed.
- .7 Circuit breakers to match panelboard interrupting capacity with minimum 10 kA at 208 V and be provided with ground fault protection where indicated in power outlet panels in accordance with Specification Section 26 27 26 - Wiring Devices.
- .8 Breakers must be new, complete with original factory warranty and supplied from an authorized manufacturer's distributor.

3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.
- .2 Connect main secondary service to line terminals of breaker.
- .3 Connect load terminals of breaker to feeders.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance Section 26 05 00 – Common Work Results - Electrical.
- .2 Check factory made connections for mechanical security and electrical continuity.
- .3 Check trip unit settings and to ensure proper working operation and protection of components.

END OF SECTION

1 General

1.1 WORK INCLUDED

- .1 Planning and executing measures to prevent and control soil erosion.
- .2 Furnishing, installing and maintaining erosion control materials.

1.2 REFERENCE STANDARDS

- .1 The requirements of the P.E.I. Department of Environment and as directed on site by Consultant.

1.3 PRODUCT CONDITIONS

- .1 Schedule temporary seeding, mulching and other erosion control measures to take place as soon as possible, prior to beginning any work.
- .2 When temporary seeding cannot be accomplished to have established or visible growth by October 15, the disturbed areas shall be covered with 150 mm mulch for the winter.

2 Products

2.1 MATERIALS

- .1 Hay Bales: Securely tied baled at least 355 mm x 460 mm x 760 mm.
- .2 Geotextile fabric, including means of anchoring.
- .3 Mulch Material: Select mulch material for erosion control that will best meet the site conditions from the following:
 - .1 Hay or Stray- Shall be dry, free to mold and weed seeds.
 - .2 Wood chips - Shall be dry, free of soil and other foreign material.
- .4 Mulch Anchoring: When mulch must be held in place, one of the following mulch anchoring materials shall be used:
 - .1 Mulch Netting (plastic, or plastic and wood fiber); North American Green, SC 150 or equal.
- .5 Fertilizer: Complete fertilizer 10-20-20 (standard product).
- .6 Lime: Ground limestone containing not less than 95% total carbonates (calcium or magnesium).
- .7 Temporary Seed Mixture: as follows:
 - 30% Regent Kentucky Bluegrass
 - 30% Park Kentucky Bluegrass
 - 30% Creeping Red Fescue
 - 10% Fiesta 2 Perennial Ryegrass

3 Execution

3.1 EROSION AND SEDIMENT CONTROL

- .1 Provide sediment protection measures as indicated on design drawings and as specified under this Section and in accordance with PEI Department of Transportation, Infrastructure & Energy, PEI Department of Environment.
- .2 Install geotextile fabric over top of new and existing catch basins to eliminate sediment from entering into sanitary or storm sewer system. Maintain as required.
- .3 Install sediment control berm, silt fences and silt screens where required to prevent siltation. Construct and install silt fences as indicated just up-slope of the area to be protected in order to prevent silt from being conveyed to an adjacent property or watercourse/wetland.
- .4 Maintain erosion control structures to coordinate with the schedule and sequence of the

- site work. Adjust erosion control structures as required.
- .5 Construct and maintain ditch dams properly designed to prevent migration of silt caused by the construction activities.
- .6 Maintain sediment control features throughout the construction period. Repair damage to original condition.
- .7 Remove accumulated sediment from behind berm and fences as necessary. Trapped sediment shall be removed when it has accumulated to a level half the height of the fence/barrier and shall be disposed of at a location outside the buffer zone of a watercourse and such that it cannot enter a watercourse or other environmentally sensitive area.
- .8 Do not remove any control features until authorized by Consultant.
- .9 Remove berm and fences when reinstatement has been well established and there will be no further erosion

3.2 GENERAL CONSTRUCTION SEQUENCE TO MINIMIZE EROSION

- .1 Erect hay bale dikes and/or silt fences as shown on Drawings and as may be required in the field to protect property, waterways, grassed areas, roadways, parking lots, existing features and springs.
- .2 Commence excavation. Stockpile soil so that erosion is minimized. Extra precautions shall be taken when soil is saturated.
- .3 Backfill excavation to grade. Grade site so that soil erosion caused by runoff will be minimized.
- .4 Seed and mulch exposed ground.

3.3 SEEDING AND MULCHING

- .1 All areas which will remain open shall be seeded and mulched within five (5) days of being stripped or backfilled and graded.

3.4 HAY BALES

- .1 Embed hay bales into soil and anchor in place with stakes as shown on the drawings. Butt hay bales together tightly.
- .2 Hay bales shall be replaced when they become clogged with soil particles or as directed by the Consultant.

3.5 DAMAGE AND REPAIR

- .1 Repair all damages caused by soil erosion or construction equipment at or before the end of each working day.

END OF SECTION

1 General

1.1 SCOPE OF WORK

- .1 The work of this Section comprises the furnishing of all equipment, labour and materials necessary for the excavation, trenching and backfilling, as specified in this Section and indicated on the drawings.
- .2 The work of this Section comprises the furnishing of all labor, materials, and equipment necessary for the control of dust and other airborne pollutants or contaminants generated by the work of this project.
- .3 It is the responsibility of the Contractor to perform the entire work of this project in a manner which will reduce airborne dust to an absolute minimum and prevent the blowing of dust beyond the limits of construction area. This will require the strict observance of all control measures specified in this Section and other restrictions as may be deemed necessary by the Contractor, Consultant or Owner's representative during the course of construction, including the requirement to cease operations..
- .4 The requirements of the following Prince Edward Island Department of Transportation & Infrastructure, Specifications are to be followed for all work relating to the material specifications.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-03, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 DEFINITIONS

- .1 Dust as defined in this Section is any airborne particulate that may result from the work of this project, which includes, but is not limited to:
 - .1 Soil particles.
 - .2 Fertilizer.
 - .3 Limestone.
 - .4 Soil additives.
 - .5 Sand.
- .2 Rock :
 - .1 Any solid material in excess of 1.00 m³ and which cannot be removed by means

of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket.
Frozen material not classified as rock.

- .3 Common excavation: .
 - .1 Excavation of materials of whatever nature, which are not included under definitions of rock excavation
- .4 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .5 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .6 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .7 Cohesionless soil: For compaction purposes, cohesionless soil is:
 - .1 Materials having less than 20% passing 75 micrometres sieve, regardless of plasticity of fines.
- .8 Cohesive soil: For compaction purposes, cohesive soil is soil not having properties to be classified as cohesionless.
- .9 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422.
 - .2 Sieve sizes to CAN/CGSB-8.1.
 - .3 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

1.4 VEHICLE REQUIREMENTS

- .1 All trucks bringing fill materials to site and removing surplus materials from site are to have a heavy-duty tarpaulin covering the truck box, properly tied down, to prevent the spillage of materials or blowing of dust during transportation.
- .2 Vehicles not equipped with a tarpaulin will not be allowed on site.

1.5 WORK RESTRICTIONS

- .1 Contractor will be required to stop work when wind speed, or unusually dry conditions are such, that in the Contractor's, Consultant's or Owner's representative's opinion, the control measures required under this Section are, or will be, unable to prevent the blowing of dust beyond the limits of the site.

1.6 AFTER WORKDAY REQUIREMENTS

- .1 During unusually dry conditions and when predicted wind speed is of a velocity, that in the Contractor's, Consultant's or Owner representative's opinion will result in dust being blown beyond the limits of the site, the Contractor will continue the control measures specified in this Section throughout non-working hours, as required to prevent the blowing of dust.

1.7 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only; completeness and accuracy are not guaranteed.
 - .2 Prior to commencing any excavation work, notify applicable Utility or authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavation.
 - .4 Maintain and protect from damage, water, sewer, gas, electric or other utilities encountered.
 - .5 Obtain direction of Consultant before moving or otherwise disturbing utilities or structures.
 - .6 Where indicated, re-route existing lines in area of excavation.
 - .7 Pay costs for such work.
 - .8 Record in accordance with requirements of Section 01 78 00 - Closeout Submittals, locations of maintained, re-routed and abandoned underground services.
 - .9 Make good and pay for damage to any lines resulting from work.
- .2 Existing surface features:
 - .1 Protect existing surface features, which may be affected by work from damage while work is in progress and repair damage resulting from work.
 - .2 Where excavation necessitates root or branch cutting do so only under direct control of Consultant.
 - .3 Provide protection around bench markers, layout markers, survey markers, geodetic monuments and signage.

1.8 SHORING BRACING AND UNDERPINNING

- .1 Comply with Section 01 35 29 - Health, Safety, and Emergency Response Procedures and applicable local regulations and to protect existing features.
- .2 Whenever shoring, sheeting, timbering and bracing of excavations or underpinning is required engage services of a Professional Engineer registered in Prince Edward Island, Canada, to design and assume responsibility for adequacy of shoring, bracing and underpinning.
- .3 Design and supporting data submitted to bear the stamp and signature of qualified Professional Engineer registered in Canada.

1.9 COMPACTION DENSITIES

- .1 Compaction densities indicated are Standard Proctor Maximum Dry Densities.

1.10 SERVICES

- .1 Provide temporary supports for existing storm and sanitary sewer lines and water main exposed during construction and install new sand bedding, cover and rigid insulation simultaneous with backfilling. Ensure that full bearing is provided under existing lines.

1.11 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Inform Consultant at least two (2) weeks prior to beginning Work, of proposed source of fill materials and provide analysis if requested.

1.12 QUALITY ASSURANCE

- .1 Engage services of qualified professional Engineer registered in Province of Prince Edward Island, Canada to design and inspect shoring, bracing and underpinning

required for Work.

.2 Health and Safety Requirements:

- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.13 DELIVERY, STORAGE AND HANDLING

.1 Storage and Protection:

- .1 Protect existing features in accordance with Section 01 50 00 - Facilities and Controls and applicable local regulations.

1.14 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate for disposal waste material in appropriate on-site bins in accordance with Waste Management Plan.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Ensure emptied containers are sealed and stored safely.
- .4 Divert excess aggregate materials from landfill for reuse.

2 Products

2.1 MATERIALS

- .1 Type 1 Fill: Crushed rock composed of hard sound, durable uncoated, cubical fragments of consistent quality produced from non-sedimentary bedrock or non-sedimentary boulders, to comply with the P.E.I. Department of Transportation & Infrastructure, Specification 401 - Aggregate, for Class 'A' material graded within the following limits:

.1	ASTM Sieve Size	Percent Passing
	31.5mm	100
	25.0mm	95 - 100
	12.5mm	50 - 83
	4.75mm	30 - 60
	1.18mm	15 - 40
	600mm	10 - 32
	300mm	5 - 22
	75mm	3 - 9

- .2 Type 2 Fill: Crushed rock composed of hard sound, durable uncoated, cubical fragments of consistent quality produced from non-sedimentary bedrock or non-sedimentary boulders, to comply with the P.E.I. Department of Transportation & Infrastructure, Specification 401 - Aggregate, for Class 'B' material graded within the following limits:

.1	ASTM Sieve Size	Percent Passing
	31.5mm	100
	25.0mm	95 - 100
	12.5mm	50 - 83
	4.75mm	30 - 60
	1.18mm	15 - 43
	600mm	10 - 35
	300mm	5 - 26
	75mm	3 - 7

- .3 Type 3 Fill: imported, classified as Common Fill, or material from excavation or other sources, approved by Consultant for use intended, unfrozen, free from rocks larger than 75mm, cinders, ashes, sods, refuse or other deleterious materials.
- .4 Type 4 Fill: natural sand or crushed rock screening, free from clay, shale or organic matter, to comply with P.E.I. Department of Transportation & Infrastructure, Specification

402 -Bedding Sand, graded with the following limits:

.1	ASTM Sieve Size	Percent Passing
	9.5mm	100
	4.75mm	87 - 98
	2.36mm	55 - 95
	1.18mm	30 - 90
	600mm	10 - 70
	300mm	0 - 35
	150mm	0 - 15
	75mm	0 - 8

.5 Type 5 Fill: to requirements of Prince Edward Island, Department of Transportation & Infrastructure, 1998 Specification #206.02.02 - Select Borrow as follows:

.1 Borrow shall be non-plastic and composed of clean, uncoated particles free from lumps of clay or other deleterious material with a maximum particle size of 100mm, and a maximum of 30% of the material passing the 4.75 sieve shall pass the 0.075 mm sieve.

.6 Type 6 Fill: clean, washed coarse sand free from clay, shale and organic matter and graded within the following limits:

.1	Sieve Size	Percent Passing
	12.5mm	- 100
	4.75mm	90 - 100
	0.85mm	40 - 100
	0.35mm	0 - 75
	0.25mm	0 - 38
	0.75mm	0 - 8

.7 Type 7 Fill: Crushed rock, composed of hard, sound, durable, uncoated, cubical fragments of consistent quality produced from non-sedimentary bedrock or non-sedimentary boulders, graded within the following limits, to comply with the P.E.I. Department of Transportation & Infrastructure, Specification 401 - Aggregate for Class 'D' Material.

.1	ASTM Sieve Size	Percent Passing
	50.0mm	100
	38.0mm	60 - 100
	31.5mm	50 - 100
	25.0mm	35 - 70
	19.0mm	20 - 50
	12.5mm	10 - 35
	9.5mm	5 - 25
	4.75mm	0 - 10

.8 Clay Liner:

- .1 All materials supplied and placed shall conform with Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment, and Disposal;
- .2 The Contractor must submit samples of the clay liner to a local testing lab for prequalification testing;
- .3 Contractor to provide results of laboratory testing for the clay liner with a maximum permeability of 1×10^{-6} cm/s;
- .4 Clay liner to have a maximum particle size of 25 mm and a plasticity index greater than 7;
- .5 Clay liner to be placed in three (3) uniform lifts for the cell bottom (500 mm total) and four (4) lifts for the side slopes (700 mm);

- .6 Each lift of the clay liner to be compacted to 98% of Standard Proctor maximum dry density;
- .7 Multiple samples of each lift of the compacted clay liner should be recovered during cell construction for laboratory permeability testing.
- .9 Insulation: Rigid insulation, Board insulation adhesive: Type A to CGSB 71-GP-24M, Type 2 (trowel applied), Class A.
 - .1 Acceptable Material:
 - .1 Dow Styrofoam SM.10.
 - .2 Celfort Celfortec 300.
 - .3 Owens Corning Foamular C-3.
- .10 Filter Fabric:
 - .1 Filter light-weight, non-woven polypropylene fiber fabric, needle punched and heat set.
- .11 Polyethylene film: 6 mil and 10 mil thickness.
- .12 Corrugated Plastic Culvert:
 - .1 ASTM F 405- [93], Specification for Corrugated Polyethylene (HDPE) Tubing and Fittings.
 - .2 Corrugated Polyethylene (HDPE) open-profile sewer pipe to CSA B182.8 (non-perforated) with integral snap-type bell end and double bell silt tight integrated gasket. Size as indicated.
 - .3 Acceptable Material:
 - .1 Soleno Inc. Solflo Flowmax.

2.2 EQUIPMENT

- .1 For application of water use pressurized distributor equipped with a spray system that will ensure even distribution of controlled quantities of water with means of shut-off to avoid dumping of excess water.
- .2 Following final grading and seeding use only a water distribution vehicle with tires of sufficient size that any impression left by the tires can, if necessary, be repaired by a light hand raking.

3 Execution

3.1 GENERAL

- .1 Carry out work to prevent blowing dust and debris during construction.

3.2 APPLICATION

- .1 Apply water over entire area of operation in sufficient quantities to prevent blowing of dust, but not to create excess moisture that will prevent segregation of materials, or interfere with proper placement of materials. Application of water is required at all stages of work, which includes, but is not limited to, the following.
 - .1 Stripping of topsoil.
 - .2 Excavation Work.
 - .3 Grading operations.
 - .4 Placement of fill materials.
 - .5 Placement of topsoil.
 - .6 Removal of surplus materials.

3.3 PROTECTION OF STOCKPILES

- .1 Apply water to materials during stockpiling operations and either cover stockpile at end of day or continue with application of water both during workday and after hours in to ensure acceptable dust control.

3.4 TRANSPORTATION OF MATERIALS

- .1 Leave tarpaulins in place during dumping of fill materials being brought to the site.
- .2 Water materials being loaded onto trucks for removal from site and secure tarpaulins before leaving loading area.

3.5 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.6 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated after area has been cleared of brush and removed from site.
- .2 Strip topsoil to depths as indicated. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as indicated or directed by Consultant. Stockpile height not to exceed 2 m and should be protected from erosion.
- .4 Dispose of unused topsoil to location as indicated.

3.7 STOCKPILING

- .1 Stockpile fill materials in areas designated by Consultant. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.8 SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
- .2 Obtain permit from authority having jurisdiction for temporary diversion of water course.
- .3 Construct temporary Works to depths, heights and locations as indicated.
- .4 Upon completion of substructure construction:
 - .1 Remove shoring and bracing.
 - .2 Remove excess materials from site.

3.9 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection and in manner not detrimental to public and private property, or portion of Work completed or under construction.
- .4 Provide settling basins, or other facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.10 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Excavation must not interfere with normal 45° bearing splay of adjacent foundations.
- .3 Following completion of excavation work and prior to placement of any structural fill material proof roll existing sub-grade exposed by excavation with a large vibratory roller (CAT CS-563E or equivalent). Remove 'soft' material and replace with new structural fill in accordance with requirements of this Section compacted to 100% density.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or

- saw.
- .5 For trench excavation, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 5 m at end of day's operation.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material in approved location.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, dry, level, free from loose, soft or organic matter.
- .11 Notify Consultant when bottom of excavation appears unsuitable.
- .12 Obtain Consultant's approval of completed excavation.
- .13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.
- .14 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 98% of corrected Standard Proctor maximum dry density
- .15 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil
- .16 Rock excavation:
 - .1 For the purpose of bidding it is to be assumed that solid sandstone bedrock, as defined under Par. 1.4 above, will not be encountered during the work of this Section. Rock Excavation will not be considered extra to the contract.

3.11 FILL TYPES AND COMPACTION

- .1 Dimensions specified in following paragraphs are minimum dimensions of fill after compaction.
- .2 Underground services:
 - .1 Use Type 4 Fill (bedding sand), or approved equal to provide bedding and cover as indicated compacted full width of trench to minimum 95% density.
 - .2 Use excavated material to underside of granular base for floor slab at interior of addition, compacted to 100% density.
 - .3 Use Type 3 Fill to underside of topsoil at landscaped areas compacted to density at least equal to adjacent undisturbed soil or minimum 95%.
- .3 Camping sites: as indicated on the Drawings.

3.12 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.
- .3 Provide minimum 50mm thick x 600mm wide rigid insulation over all piping where ground cover is less than 1.5m.

3.13 BACKFILLING

- .1 Do not proceed with backfilling operations until Consultant has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Backfilling around site installations.
 - .1 Place bedding and surround material as specified and indicated in applicable Section for service or utility to be installed.

- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing.
- .3 Place layers simultaneously on both sides of installed work to equalize loading.
- .4 Place material by hand under, around and over installations until 600mm of cover is provided, except where specifically permitted otherwise. Dumping material directly on installations will not be permitted.
- .5 Place backfill material in uniform layers not exceeding 150mm up to grades indicated. Compact each layer before placing succeeding layer. Use methods to prevent damage to installations.

3.14 TESTING AND INSPECTION

- .1 Testing of materials and inspection and testing of placement and compaction will be carried out by testing laboratory appointed and paid for by the Contractor, in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services. Frequency of tests will be determined by the testing laboratory.

3.15 RESTORATION

- .1 Upon completion of work, remove surplus materials and debris, trim slopes and correct defects noted by Consultant.
- .2 Clean and reinstate areas affected by work to satisfaction of Consultant.

3.16 SURPLUS MATERIAL

- .1 Remove all surplus material from site, and pay all fees as may be charged at disposal site.
- .2 Remove all soil contaminated with oil, gasoline, calcium chloride or other toxic or dangerous materials resulting from the work of this contract and dispose of in manner to minimize danger at site and in a manner and to a location off site approved by Provincial Authority governing such disposal.

3.17 EXPLORATORY EXCAVATIONS

- .1 As required and necessary to locate and identify underground services and utilities. Obtain approval from Consultant and Utilities prior to excavations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 31 22 13 - Rough Grading.
- .2 Section 32 93 10 - Trees, Shrubs and Groundcover Planting

1.2 REFERENCES

- .1 PEI Department of Transportation & Infrastructure, General Provisions and Contract Specifications for Highway Construction:
 - .1 Section 200 - Earthwork, P.E. Department of Transportation & Infrastructure's General provisions and Contract Specifications for Highway Construction.
 - .1 Section 212 - Topsoil and Landscaping.
 - .2 Section 800 - Environment, P.E. Department of Transportation & Infrastructure's General provisions and Contract Specifications for Highway Construction.
 - .1 Section 803 - Hydro Seeding.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 If required, Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

2 Products

2.1 MATERIALS

- .1 Topsoil will be imported as required.

2.2 TOPSOIL

- .1 Mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
- .2 Topsoil for seeded/sodded areas:
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 15 % clay, and contain 3 to 5 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials or debris.
 - .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: friable when moist.
- .3 Planting Beds and Tree Pits:
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 30 to 70 % sand, 15-30% clay, and contain 5 to 20 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials or debris.
 - .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: friable when moist.

2.3 SOIL AMENDMENTS

- .1 Fertilizer as recommended by soils tests for:
 - .1 Trees and shrubs.
 - .2 Lawn.
- .2 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
 - .3 Limestone as recommended by soils test.
- .3 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro nutrients suitable to specific plant species or application or defined by soil test.

2.4 SOURCE QUALITY CONTROL

- .1 Site shall be stripped and topsoil shall be stockpiled on site for re-use. Supplemental topsoil shall be imported as required.
- .2 Topsoil to be screened and amended.
- .3 Contractor is responsible for topsoil testing and requirements for amendments to supply topsoil as specified.
- .4 Soil testing by recognized testing facility for PH, P, N and K, and organic matter and sand content.
- .5 Testing of topsoil will be carried out by testing laboratory designated by Consultant. Soil sampling, testing and analysis to be in accordance with Provincial standards.
- .6 Owner will pay for cost of soils tests.

3 Execution

3.1 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct prior to placement of topsoil. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, lumps of turf, roots, branches, stones in excess of 50 (twenty-five) mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75 (seventy-five) mm above surface. Dispose of removed material off site under direction of Consultant.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 50 (fifty) mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 PLACING AND SPREADING OF TOPSOIL

- .1 Place topsoil after Consultant has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sod areas keep topsoil 15 (fifteen) mm below finished grade.
- .4 Spread topsoil as indicated to following minimum depths after rolling and settlement.
 - .1 150mm for seed areas.
 - .2 150mm for sod areas.
 - .3 450mm for planting beds.
 - .4 As indicated for tree pits.
 - .5 Manually spread topsoil/planting soil around existing trees, shrubs and obstacles.

3.3 SOIL AMENDMENTS

- .1 For tree pits and lawn areas: apply and thoroughly mix soil amendments into full specified depth of topsoil.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Consultant. Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

- .1 Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

- .1 Dispose of surplus materials off site.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.8 MEASUREMENT

- .1 Measurement of this work shall be included as part of hydraulic seeding or sod in place. Refer to Section 803 - Hydro Seeding and Section 809 - Sodding of P.E. Department of Transportation & Infrastructure's General provisions and Contract Specifications for Highway Construction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 22 13 - Rough Grading.
- .3 Section 31 22 19 - Finish Grading.

1.2 SOIL STABILIZATION

- .1 Hydroseeding is to be used for soil stabilization on all landscaped surfaces and as required for erosion control.

1.3 SUBMITTALS

- .1 Product Data.
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed.
 - .2 Mulch.
 - .3 Tackifier.
 - .4 Fertilizer.
 - .3 Submit in writing to Consultant 5 days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in liters.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.5 SCHEDULING

- .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
- .2 Schedule hydraulic seeding using grass mixtures and mixtures containing Crownvetch between dates recommended by the Provincial Agricultural Department.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and waste materials in accordance with Waste Management Plan.
- .2 Divert unused fertilizer from landfill to official hazardous material collections site.
- .3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

2 Products

2.1 MATERIALS

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance

- with Government of Canada "Seeds Act" and "Seeds Regulations".
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green coloring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fiber.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
 - .3 Tackifier: water dilutable, liquid dispersion.
 - .4 Water: free of impurities that would inhibit germination and growth.
 - .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
 - .6 Inoculants: inoculant containers to be tagged with expiry date.

3 Execution

3.1 WORKMANSHIP

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Consultant.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until plants are established.

3.2 PREPARATION OF SURFACES

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Cultivated areas identified as requiring cultivation to depth of 25mm.
- .3 Ensure areas to be seeded are moist to depth of 150mm before seeding.
- .4 Obtain Consultant's approval of grade and topsoil depth before starting to seed.

3.3 FERTILIZING PROGRAM

- .1 Apply lime at a rate of 50kg per 100m² or at a rate determined by soil analysis.

3.4 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Consultant. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.5 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and

- during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
- .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
- .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture applied per hectare.
 - .1 Seed: Grass mixture 2.0 kg, or as recommended by seed manufacturer.
 - .2 Mulch: Type 10 kg.
 - .3 Water: Minimum 100 L.
 - .4 Fertilizer: 500 kg, of nitrogen.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent grass areas or sodded areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Protect seeded areas from trespass satisfactory to Consultant.
- .8 Remove protection devices as directed by Consultant.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until acceptance by Consultant.
- .2 Grass Mixture:
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Consultant.
 - .3 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles; water in well.
 - .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
 - .1 If chemical means are used, comply with manufacturers written instructions and environmental regulations.
 - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
- .3 Repair and Maintenance:
 - .1 Repair minor dead and bare spots as determined by Consultant to allow establishment of seed prior to acceptance.
 - .2 Negotiate repair of major dead and bare spots as determined by Consultant in accordance with site climatic averages and recommendations of local agricultural governmental representative.
 - .3 Mow grass to 100mm whenever height reaches 200 mm and as follows:
 - .1 Do not mow within period commencing 3 weeks before and ending 3 weeks after first severe, average fall frost date and 3 weeks after actual severe fall frost.
 - .2 When mowing after first severe fall frost, mow at a height of not less than 300 mm.
 - .4 Remove clippings which will smother plants as directed by Consultant.

- .5 Water seeded areas to maintain optimum soil moisture level for germination and continued growth. Control watering to prevent washouts.

3.7 ACCEPTANCE

- .1 Seeded areas will be accepted by Consultant provided that:
 - .1 Plants are uniformly established.
 - .2 Areas have been mown at least twice.
 - .3 Areas have been fertilized.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.8 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Repair and reseed dead or bare spots to satisfaction of Consultant.
 - .2 Mow areas seeded, remove clippings, as directed by Consultant.

3.9 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 00 - Excavation and Fill.
- .2 Section 33 31 13 - Public Sanitary Utility Sewerage Piping.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C139-17, Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .2 ASTM C478M-19, Specification for Precast Reinforced Concrete Manhole Sections Metric.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium. Includes:
 - .1 CAN/CSA-A5-98, Portland Cement.
 - .2 CAN/CSA-A8-98, Masonry Cement.
 - .3 CAN/CSA-A23.5-98, Supplementary Cementing Materials.
 - .2 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .3 CAN/CSA-G30.18-09(R2014), Billet Steel Bars for Concrete Reinforcement.
 - .4 CAN/CSA-G164-2018, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's drawings, information and shop drawings.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate for disposal waste material and place in appropriate on-site bins in accordance with Waste Management Plan.
- .2 Divert unused concrete materials from landfill.
- .3 Divert unused aggregate materials from landfill.

2 Products

2.1 MATERIALS

- .1 Materials
 - .1 Precast sanitary and storm manhole sections: to ASTM C478M, circular or oval. Top sections eccentric cone with opening offset for vertical ladder installation (where indicated). Units to have integral precast base section with benching at sanitary manholes and performed gasketed openings for pipes.
 - .2 Provide openings in walls of manholes as required to suit size and inverts of lines. Confirm size and invert before fabrication.
 - .3 Acceptable Material:
 - .1 Campbells' Concrete Ltd.
 - .2 L.E. Shaw Limited.
 - .4 Frames, gratings, covers to plan dimensions and following requirements:
 - .1 Manhole frames and cover: heavy duty municipal type for road service. Cover cast without perforations and complete with two - 1 inch square lifting holes.
 - .2 Acceptable Material:
 - .1 Hall and Stavert No. 26 or equal.

- .5 Cast-in-place base slab: use permitted only where use of integral base is not practical and when approved by Consultant.
- .6 Concrete Grout:
 - .1 Non shrink, non metallic, grout capable of developing compression strength of 50mPa at 28 days.
 - .2 Acceptable Material: Meadows "Sealtight CG-86"
- .2 Precast catch basin sections: to ASTM C139, ASTM C478M.
 - .1 Acceptable material:
 - .1 Campbells' Concrete Ltd.
 - .2 L.E. Shaw Limited.
- .3 Joints: to be made watertight using rubber rings, bituminous compound, epoxy resin cement or cement mortar.
- .4 Ladder rungs: to CAN/CSA-G30.18, No.25M billet steel deformed bars, hot dipped galvanized to CAN/CSA-G164. Rungs to be safety pattern (drop step type).
- .5 Adjusting rings: to ASTM C478M.
- .6 Drop manhole pipe: to be same as sewer pipe.

3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 00 - Excavation and Fill and as indicated.
- .2 Obtain approval of Consultant before installing outfall structures, manholes or catch basins.

3.2 CONCRETE WORK

- .1 If required, do concrete work in accordance with CSA-A23.1/A23.2.
- .2 Position metal inserts in accordance with dimensions and details as indicated.

3.3 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
- .3 Dewater excavation to approval of Consultant and remove soft and foreign material before placing concrete base.
- .4 Installation of units:
 - .1 Set precast concrete base section to ensure proper alignment and invert elevations, on minimum 150mm of imported granular material compacted to 100% corrected maximum dry density. When use of cast-in-place base slab approved set bottom section of manhole in bed of cement mortar and bond to concrete slab.
 - .2 When cast-in-place slab approved set bottom section of manhole in bed of cement mortar and bond to concrete slab.
 - .3 Make each successive joint watertight with approved rubber ring gaskets or bituminous compound. If bituminous compound used, apply to CGSB 56-GP-9A.
 - .4 Clean surplus grout and joint compounds from interior surface of unit as work progresses.
 - .5 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
- .5 For sanitary sewers:

- .1 When use of cast-in-place base slab approved by Consultant bench to provide a smooth U-shaped channel. Side height of channel to be full diameter of sewer. Slope adjacent floor at 1 in 10 toward channel. Curve channels smoothly. Slope invert to establish sewer grade.
- .6 Compact granular backfill to 95% corrected maximum dry density.
- .7 Place frame and cover on top section to elevation as indicated. If adjustments required use concrete rings to suit finished grade elevations.
- .8 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- .9 Install safety platforms in manholes having depth of 5 m or greater, as indicated.

3.4 NEW CONNECTION AT EXISTING STORM/SANITARY MANHOLE

- .1 Core drill opening in wall of existing manhole to suit diameter and invert of new storm/sanitary line connection, complete with rubber ring.
- .2 Fit rubber ring on pipe to place it at the center of the wall of the manhole. Grout line in place from both sides and make watertight.
- .3 Provide cast-in-place concrete saddle to support existing piping where new pipe crosses an existing pipe and where the distance is less than 300mm.

3.5 LEAKAGE TEST

- .1 Install watertight plugs or seals on inlets and outlets of each new sanitary sewer manhole and fill manhole with water. Leakage not to exceed 0.3% per hour of volume of manhole.
- .2 If permissible leakage is exceeded, correct defects. Repeat until approved by Consultant.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for water mains, hydrants, valves, valve boxes, and valve chambers, including service connections.

1.2 RELATED SECTIONS

- .1 Section 31 23 00 - Excavation and Fill.

1.3 REFERENCES

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C651-99, Disinfecting Water Mains.
 - .2 ANSI/AWWA C800-01, Underground Service Line Valves and Fittings (Also Included: Collected Standards for Service Line Materials).
 - .3 ANSI/AWWA C900-97, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 Inch through 12 Inch (100 mm - 300 mm), for Water Distribution.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM F714-01, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- .3 American Water Works Association (AWWA)/Manual of Practice
 - .1 AWWA M11-1989, Steel Pipe - A Guide for Design and Installation.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA B137 Series-02, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
 - .2 CSA B137.3-02, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.
 - .3 CAN/CSA-G30.18-M92(R1998), Billet Steel Bars for Concrete Reinforcement.
 - .4 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S520-1991, Hydrants.
 - .2 CAN4-S543-1984, Internal-Lug, Quick Connect Couplings for Fire Hose.
- .6 Atlantic Canada Guidelines for the supply, treatment, storage, distribution and operation of Drinking Water Supply Systems.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Consultant of proposed source of bedding materials and provide access for sampling at least two (2) weeks prior to commencing work.
- .3 Submit manufacturer's test data and certification that pipe materials meet requirements of this section at least two (2) weeks prior to beginning work. Include manufacturer's drawings, information and shop drawings where pertinent.
- .4 Pipe certification to be on pipe.

1.5 CLOSEOUT SUBMITTALS

- .1 Provide data to produce record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material, location of air and vacuum release valves, hydrant details, maintenance and operating instructions in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, valve chambers and hydrants.

1.6 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions to Consultant for approval and adhere to interruption schedule as approved by Consultant.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal waste material in appropriate on-site bins in accordance with Waste Management Plan.
- .3 Separate for reuse and place in designated containers Steel waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Ensure emptied containers are sealed and stored safely.
- .7 Divert unused metal materials from landfill to metal recycling facility.
- .8 Divert unused concrete and aggregate materials from landfill to local quarry.
- .9 Do not dispose of unused disinfection material into sewer system, streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

2 Products

2.1 COMPLIANCE

- .1 All water piping and appurtenances must meet and comply with NSF/ANSI 61: Drinking Water System Components – Health Effects Standard Overview.

2.2 POTABLE WATER (CHARLOTTETOWN)

- .1 Plastic Pipe and Fittings
 - .1 Polyvinyl chloride pressure pipe: to AWWA C900 and CAN/CSA B137.3, pressure class 150, gasket bell end with rubber gasket to size indicated.
 - .2 Acceptable Material:
 - .1 IPEX "Blue Brute" DR18 PVC pipe and fittings.
 - .3 Fittings (PVC Alternate): Cast iron, mechanical joint, to ANSI/AWWA C153/A21.53.
- .2 Service Connections:
 - .1 All water services to be 19mm copper Type K (or approved equal), minimum pressure rating 1035 kpa.
 - .2 Points: compression type, minimum pressure rating 1045 kpa.
 - .1 Acceptable material: Muller 110, H-15403/H-12940 or Cabibridge Brand 118-H3H3/119-H3H3.
 - .3 Service Box: Mueller A-726 complete with Standard Steel Rod.
 - .4 Couplings: Mechanical point sleeve type AWWA C110.
 - .5 Tapping sleeve and valve:
 - .1 Heavy welded steel body with recessed grooves to retain gasket, for 150 psi service, c/w test plug, steel/flat face flange recessed for standard tapping valve, to ANSI/AWWA C207, Class D, ANSI 150 lb, and gaskets for 212° service.
 - .2 Acceptable Material:
 - .1 Ford "Style FTS".
- .3 Reaction Backing
 - .1 Concrete: 20 Mpa compressive strength.

- .4 Pipe Disinfection
 - .1 Sodium or calcium hypochlorite to AWWA B300 to disinfect water mains.

2.3 VALVE BOXES

- .1 Valve Boxes: to AWWA C500 and as follows:
 - .1 Cast-iron, slide type, adjustable for depth of pipe below finished grade.
 - .2 Covers marked "Water".
 - .3 Acceptable Material: Mueller A-759, 5.25 inch, complete box including guide plate.

2.4 SERVICE PIPE AND FITTINGS

- .1 Copper tubing: to ASTM B 88, type K annealed, minimum pressure rating 1035 kPa.
- .2 Joints: compression type, minimum pressure rating 1045 kPa.
 - .1 Acceptable Material: Mueller 110, H-15403/H-12940; Cambridge Brass 118-H3H3/119- H3H3.
- .3 Corporation stop: brass to ASTM B 62, compression type, inlet threads to AWWA C800.
 - .1 Acceptable Product: Mueller H-15008; Cambridge Brass 302- A3H3.
- .4 Curb stop and drain: brass to ASTM B 62, compression type joints.
 - .1 Acceptable Product: Mueller Oriseal H-15219; Cambridge Brass 203- H3H3.
- .5 Service clamp: bronze body, confined o-ring seal cemented in place, and straps suitable for connecting main. Outlet tapped and threaded to AWWA C800.
- .6 Service box: adjustable type, cast-iron bottom section, cast-iron lid with recessed pentagon nut and internal stem to suit depth of bury. Service box to have appropriate foot piece.
 - .1 Acceptable Product: Mueller a-726 complete with stainless steel rods.

2.5 COUPLINGS

- .1 Mechanical joint sleeve type: to AWWA C110 for use on new ductile iron pipe. Provide spacer ring between pipe ends.
- .2 Grooved and shoulder type: to AWWA C606 with malleable iron housing, halogenated butyl gasket and heat treated, plated carbon steel bolts and nuts to ASTM A 183.
- .3 Collar type: steel with minimum pressure rating 1035 kPa, appropriate to the type and size of pipe being jointed, epoxy-coated with type 316 stainless steel bolts and nuts.

2.6 PIPE DISINFECTION

- .1 Sodium hypochlorite to ANSI/AWWA B300 to disinfect water mains.
- .2 Undertake disinfection of water mains in accordance with ANSI/AWWA C651.

2.7 INSULATION

- .1 Install rigid insulation to CAN/GCSB 51.20M, Type 4, minimum thickness 50mm when pipe is less than 1.5m below grade.

3 Execution

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Consultant.
 - .2 Remove defective materials from site as directed by Consultant.

3.2 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 00 - Excavation and Fill.

- .2 Trench line and depth require approval prior to placing bedding material and pipe.
- .3 Do not backfill trenches until pipe grade and alignment have been checked and accepted by Consultant.

3.3 CONCRETE REACTION BACKING

- .1 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in diameter, reducers, hydrants, fittings, and undisturbed ground as indicated, or as directed by Consultant.
- .2 Keep joints and couplings free from concrete.
- .3 Provide polyethylene sheet bond breaker between pipe, fittings, etc., and concrete.

3.4 GRANULAR BEDDING

- .1 Place granular bedding and cover materials to details indicated or directed by consultant.
- .2 Shape bed true to grade and to provide continuous uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions as required to receive bell if bell and spigot pipe are used.
- .4 Compact fill width of bed to at least 95% density.
- .5 Fill excavation below bottom of specified bedding adjacent to manholes, catchbasins or structures with sandstone fill.

3.5 PIPE INSTALLATION

- .1 Lay and join pipe in accordance with CSA B182.2-95 and manufacturer's recommendations.
- .2 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe which is not in true alignment or grade or pipe which shows undue settlement after installation.
- .4 Face socket ends of pipe in direction of laying. For mains on a grade of 2% or greater, face socket ends up-grade.
- .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .6 Do not allow water to enter pipes during construction except as may be permitted by Consultant.
- .7 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .8 Joints:
 - .1 Join plastic pipe in strict accordance with manufacturer's recommendations.
 - .2 Do not use excavating equipment to force pipe sections together.
- .9 Cut pipes as required for fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .10 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Consultant.
- .11 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .12 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
- .13 Leave joints and fittings exposed for hydrostatic and leakage testing.
- .14 Hand place granular material in uniform layers not exceeding 6 inches to 12 inches over

top of pipe. Do not dump material directly on top of pipe. Place layers uniformly on each side of pipe to prevent lateral displacement of the pipe. Compact each layer to at least 95% density.

3.6 TESTING & DISINFECTION

- .1 Notify Consultant twenty-four (24) hours in advance of all proposed tests. Perform tests in presence of and under direction of Consultant.
- .2 Before testing, bed and cover pipe between joints in accordance with paragraph 3.6 to such an extent that movement or snaking of line is prevented when test pressure is applied.
- .3 Leave joints and fittings exposed.
- .4 Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.
- .5 Open valves.
- .6 Expel air from main by slowly filling main with potable water. Install corporation stops at high points in main where no air-vacuum release valves are installed. Remove stops after satisfactory completion of test and seal holes with plugs.
- .7 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
- .8 Repeat hydrostatic test until defects have been correct.
- .9 Apply leakage test pressure of 100 psi after complete backfilling of trench, based on elevation of lowest point in main and corrected to elevation of gauge, for a period of 2 hours.
- .10 Define leakage as amount of water supplied from water storage tank in order to maintain test pressure for 2 hours.
- .11 Do not exceed allowable leakage as stated in pipe manufacturer's printed literature.
- .12 Locate and repair defects if leakage is greater than amount specified.
- .13 Repeat test until leakage is within specified allowance.
- .14 Flushing and disinfecting operations to be carried out by contractor and witnessed by Consultant. Notify Consultant at least 4 days in advance of proposed date when flushing operation to commence.
- .15 Flush water through available outlets with a sufficient flow to produce a velocity of 1.5 m/s, for 10 minutes or until foreign materials have been removed and flushed water is clear.
- .16 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .17 Provide connections and pumps required.
- .18 Open and close valves, hydrants, and service connections to ensure thorough flushing.
- .19 When flushing has been completed to satisfaction of Consultant, introduce a strong solution of chlorine into water line and ensure that it is distributed throughout entire system.
- .20 Disinfect water lines.
- .21 Rate of chlorine application to be proportional to rate of water entering pipe.
- .22 Chlorine application to be close to point of filling water line and to occur at same time.
- .23 Flush line to remove chlorine solution after 24 hours.
- .24 Measure chlorine residuals at extreme end of line being tested, in accordance with and to satisfaction of requirements of Consultant.
- .25 After installing and backfilling over lines, restore surface to original condition as directed by Consultant.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 00 - Excavation and Fill.
- .2 Section 33 05 13 - Manholes and Structures.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D2680-01, Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
 - .3 ASTM D3034-00, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - .4 ASTM D3350-02, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).
 - .2 CSA B182.6-02, Profile Polyethylene Sewer Pipe and Fittings for Leak-Proof Sewer Applications.
 - .3 CSA B182.11-02, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

1.3 DEFINITIONS

- .1 Pipe section is defined as length of pipe between successive manholes and/or between manhole and any other structure which is part of sewer system.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate proposed method for installing carrier pipe for undercrossings.
- .3 Inform Consultant at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
- .4 Ensure certification is marked on pipe.
- .5 Submit manufacturers information data sheets and instructions in accordance with Section 01 33 00 - Submittal Procedures.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.6 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule. Notify Consultant 72 hrs in advance of any changes to said schedule.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate into on site bins waste materials in accordance with Waste Management Plan.

- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused aggregate materials from landfill to quarry for reuse.
- .4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

2 Products

2.1 PLASTIC PIPE AND FITTINGS

- .1 Type PSM Polyvinyl Chloride (PVC): to ASTM D3034.
 - .1 Standard Dimensional Ratio (SDR): 35.
 - .2 Locked-in steel reinforced gasket and integral bell system.
 - .3 Nominal lengths: 4 m.
- .2 Size as indicated.
- .3 Acceptable material:
 - .1 IPEX "Ring Tite".

2.2 FORCEMAIN

- .1 Type PSM polyvinyl chloride (PVC): to CSA B137.3 and ASTM D3135, DR26 minimum.
- .2 Polyethylene (PE) conforming to CSA B137.0, B137.1 ASTM D 3035, D3356.
- .3 Provide thrust blocks at all elbows.

2.3 PIPE BEDDING AND SURROUND MATERIALS

- .1 Granular material to Section 31 23 00 - Excavation and Fill and following requirements:
 - .1 Crushed or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.

2.4 PIPE INSULATION

- .1 Extruded polystyrene to CAN/ULC-5701-1997, Type IV, RS1 value of 0.87 per 25mm thickness (R-50), ship-lapped edges to thickness indicated.
- .2 Standard of Acceptance:
 - .1 Dow Styrofoam SM
 - .2 Celfort Celfortec 300

3 Execution

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.

3.2 TRENCHING

- .1 Do not allow contents of any sewer or sewer condition to flow into trench.
- .2 Trench line and depth require approval prior to placing bedding material and pipe.
- .3 Do not backfill trenches until pipe grade and alignment have been checked and accepted by Consultant.

3.3 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 150 mm compacted thickness or as directed by Consultant.

- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95 % corrected maximum dry density.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

3.4 INSTALLATION

- .1 Lay and join pipes to: ASTM C12.
- .2 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Consultant.
- .3 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .4 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. To establish grade of gravity sewer pipe, pipe will be laid using surveyor's level or laser equipment designed for this purpose.
- .5 Commence laying at lower end and proceed in upstream direction with bell ends of pipe facing upgrade.
- .6 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .7 Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
- .8 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .9 Joints:
 - .1 Join plastic pipe in strict accordance with manufacturer's recommendations.
 - .2 Use only adapters and/or joint connectors recommended by plastic pipe manufacturer for connection to sanitary sewer line at building foundation wall.
- .10 Cut pipes as required for drops in manholes, special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .11 Make watertight connections to manholes and catch basins. At existing units or where gaskets are not integral with opening in wall of manhole or catch basin use rubber ring stretched over pipe grouted solidly in wall with non-shrink grout.
- .12 Use prefabricated saddles or other approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
- .13 Upon completion of pipe laying and after Consultant has inspected pipe joints, place specified granular material to dimensions indicated or directed by Consultant. Leave joints exposed until ex-filtration test results are completed.
 - .1 Install pipe insulation where shown to width and thickness indicated with underside 150mm above top of pipe. Extend minimum 600mm wide around manhole at same elevation.
- .14 When test results are acceptable to Consultant backfill remainder of trench.

3.5 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .3 Under paving and walks, compact backfill to at least 95 % corrected maximum dry density.
 - .1 In other areas, compact to at least 90 % corrected maximum dry density.

3.6 SERVICE CONNECTIONS

- .1 Install pipe to CSA B182.11 manufacturer's instructions and specifications.
- .2 Maintain grade for 100 and 125 mm diameter sewers at 1 vertical to 50 horizontal unless directed otherwise by Consultant.
- .3 Service connections to main sewer: standard.
 - .1 Do not use break-in and mortar patch-type joints.
- .4 Service connection pipe: not to extend into interior of main sewer.
- .5 Make up required horizontal and vertical bends from 45 degrees bends or less, separated by straight section of pipe with minimum length of four pipe diameters.
 - .1 Use long sweep bends where applicable.
- .6 Plug service laterals with water tight caps or plugs as approved by Consultant.

3.7 FIELD TESTING

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Consultant, draw a tapered wooden plug with a diameter of 50mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.
- .4 Perform ex-filtration testing as soon as practicable after jointing and bedding are complete.
- .5 Do ex-filtration testing as directed. Perform tests in presence of Consultant. Notify Consultant twenty-four (24) hours in advance of proposed tests.
- .6 Carry out tests on each section of sewer between successive manholes including service connections.
- .7 Install watertight bulkheads in suitable manner to isolate test section from rest of pipeline.
- .8 Ex-filtration test:
 - .1 Fill test section with water in such a manner as to allow displacement of air in line. Maintain under nominal head for twenty-four (24) hours to ensure absorption in pipe wall is complete before test measurements are commenced.
 - .2 Immediately prior to test period add water to pipeline until there is a head of 1020mm over interior crown of pipe measured at highest point of test solution.
 - .3 Duration of ex-filtration test to be two hours.
 - .4 Water loss at end of test period not to exceed maximum allowable ex-filtration over any section of pipe between manholes.
- .9 Infiltration and ex-filtration not to exceed following limits in L per hour per 100m of pipe, including service connections.

Nominal Pipe Diameter (mm)	Plastic Pipe
1	3.88
2	4.62
3	5.51
4	7.45
5	9.39
6	11.33
7	13.27
8	14.91
9	16.84
10	18.78
11	20.72
12	22.80

13	26.53
14	30.11
15	33.69
16	37.56
17	41.29
18	45.01

*Values shown in Columns 2 & 3 are in liters per hour per 100m of pipe.

- .10 Low pressure air testing:
- .1 Low pressure air testing may be employed as an alternate to ex-filtration test. The Contractor shall furnish all facilities and personnel for conducting the air-acceptance test under the observation of the Consultant. The equipment and personnel shall be subject to the approval of the Consultant. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 0.2813 kg/cm² (4 psi) greater than the average back pressure of any groundwater that may submerge the pipe. At least two minutes shall be considered acceptable, when tested at an average pressure of 0.211 kg/cm² (3 psi) greater than the average back pressure of any groundwater that may submerge the pipe, if:
- .1 The total rate of air loss from any section tested in its entirety between manhole and cleanout structure does not exceed 0.06 m³
- .2 The section under test does not lose air at a greater rate than 0.000093 m³ per minute per square foot of internal pipe surface.
- .11 Deflection testing:
- .1 Measure deflection by pulling a deflection gauge through each pipe section from manhole to manhole after backfilling.
- .1 Provide deflection gauges to measure a 5% and 7½% deflection. Gauges to be a "Go-No-Go" device similar to Standard Detail 02702-4 (Detail attached).
- .2 Within thirty days after installation, pull a deflection gauge measuring 5% deflection through the installed section of pipeline. If this test fails proceed with at 7½% deflection test. If 7½% deflection test fails, locate defect and repair. Retest.
- .3 Thirty days prior to completion of Period of Maintenance, pull a deflection gauge measuring 7½% deflection through the installed section of pipeline. If 7½% deflection fails, locate defect and repair. Retest.
- .12 CCTV Inspection:
- .1 Not applicable.
- .13 Repair and retest sewer line as required, until test results are within limits specified.
- .14 Repair visible leaks regardless of test results.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 31 23 00 - Excavation and Fill.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA).
 - .1 CSA C22.2 No. 211.1, Rigid Types EBI and DB2/ES2 PVC Conduit.

2 Products

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: to CSA C22.2 No. 211.1, type rigid PVC for direct burial with minimum wall thickness at any point of 1/10". Nominal length: 10' plus or minus 0.5". Type DB2 (thinwall) PVC conduits unacceptable.
- .2 Rigid PVC split ducts as required.
- .3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .4 Rigid PVC 90° and 45° bends as required.
- .5 Rigid PVC 5° angle couplings as required.
- .6 Expansion joints as required.
- .7 Preformed, interlocking intermediate duct spacers for duct size as indicated
- .8 Use epoxy coated galvanized steel conduit for sections extending above finished grade.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

- .1 Use 6mm stranded nylon pull rope tensile strength 5 kN.

2.4 MARKERS

- .1 150mm wide, polyethylene marker tape in all trenches. Use red colored tape. Install at depth as per drawings.

3 Execution

3.1 INSTALLATION

- .1 Install duct in accordance with manufacturer's instructions.
- .2 Clean inside of ducts before laying.
- .3 Ensure full, even support every 1.5 m and smooth transitions throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 During and after construction, cap ends of ducts to prevent entrance of foreign materials.
- .6 Pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.
- .8 Install continuous strip of marker tape above duct before backfilling.
- .9 Notify Departmental Representative upon completion of direct buried ducts and obtain

acceptance prior to backfill.

END OF SECTION