COLES ARCHITECTURE ENGINEERING PROJECT MANAGEMENT

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SPECIFICATIONS

KINGS COUNTY HIGWAY DEPOT
CONTRACT #1 – SITEWORK & FOUNDATION

PEI Dept. Transportation & Infrastructure
Project #: 2795-20128

PROFESSIONAL ENGINEER
The Association Of Professional Engineers Of The Province Of Prince Edward Island
Elliott G. Coles
1620
07.10.2021
Date
PROVINCE OF PRINCE EDWARD ISLAND

PROFESSIONAL ENGINEER
The Association Of Professional Engineers Of The Province Of Prince Edward Island
Nazmi Lawen
344
07 OCT 2021
Date
PROVINCE OF PRINCE EDWARD ISLAND

PROFESSIONAL ENGINEER
Sean W. Wheeler
No. 657
October 2021
PRINCE EDWARD ISLAND

Coles Associates Ltd.
Architects & Engineers

Project #: 211120 C#1 **Issued for Tender: October 07, 2021**

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TABLE OF CONTENTS

Division 00 - Procurement and Contracting Requirements

00 01 15	**LIST OF DRAWING SHEETS**	**1**
00 01 18	**APPENDICES**	**1**
00 21 13	**INSTRUCTIONS TO BIDDERS**	**11**
00 41 13	**BID FORM**	**6**
00 52 13	**AGREEMENT FORM - STIPULATED SUM**	**1**
00 73 00	**SUPPLEMENTARY CONDITIONS**	**7**

Division 01 - General Requirements

01 10 00	**SUMMARY**	**6**
01 29 00	**PAYMENT PROCEDURES**	**3**
01 29 83	**PAYMENT PROCEDURES FOR TESTING LABORATORY SERVICES**	**2**
01 32 00	**PROSECUTION AND PROGRESS**	**2**
01 32 16	**CONSTRUCTION PROGRESS SCHEDULE**	**2**
01 33 00	**SUBMITTAL PROCEDURES**	**3**
01 35 23	**OWNER SAFETY REQUIREMENTS (DEPT TI)**	**4**
01 35 29	**HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES**	**18**
01 35 43	**ENVIRONMENTAL PROCEDURES**	**1**
01 41 00	**REGULATORY REQUIREMENTS**	**1**
01 45 00	**QUALITY CONTROL**	**2**
01 50 00.01	**TEMPORARY FACILITIES AND CONTROLS**	**2**
01 51 00	**TEMPORARY UTILITIES**	**2**
01 52 00	**CONSTRUCTION FACILITIES**	**3**
01 56 00	**TEMPORARY BARRIERS AND ENCLOSURES**	**2**
01 61 00	**COMMON PRODUCT REQUIREMENTS**	**4**

01 71 00	**EXAMINATION AND PREPARATION**	**2**
01 74 00	**CLEANING AND WASTE MANAGEMENT**	**1**
01 77 00	**CLOSEOUT PROCEDURES**	**4**
01 78 00	**CLOSEOUT SUBMITTALS**	**6**
Division 03 - Concrete		
03 10 00	**CONCRETE FORMING AND ACCESSORIES**	**2**
03 20 00	**CONCRETE REINFORCING**	**2**
03 30 00	**CAST-IN-PLACE CONCRETE**	**6**
Division 22 - Plumbing		
22 11 18	**DOMESTIC WATER PIPING COPPER & PEX**	**7**
Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC)		
23 11 13	**FACILITY FUEL-OIL PIPING**	**5**
23 82 40	**UNIT HEATERS – ELECTRIC**	**2**
Division 26 - Electrical		
26 05 00	**COMMON WORK RESULTS - ELECTRICAL**	**7**
26 05 03	**ELECTRICAL REMOVALS AND ALTERATIONS**	**2**
26 05 20	**WIRE AND BOX CONNECTORS (0 - 1000V)**	**2**
26 05 21	**WIRES AND CABLES (0 - 1000V)**	**3**
26 05 28	**GROUNDING - SECONDARY**	**2**
26 05 29	**HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**	**2**
26 05 31	**JUNCTION AND PULL BOXES**	**1**
26 05 32	**OUTLET BOXES, CONDUIT BOXES AND FITTINGS**	**2**
26 05 34	**CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS**	**4**
26 05 43.01	**INSTALLATION OF CABLES IN TRENCHES AND IN DUCTS**	**2**

26 27 26 **WIRING DEVICES** **2**

26 28 16.02 **MOULDED CASE CIRCUIT BREAKERS** **1**

Division 31 - Earthwork

31 10 00 **EROSION CONTROL** **2**

31 11 00 **CLEARING AND GRUBBING** **4**

31 23 00 **EXCAVATION AND FILL** **10**

Division 32 - Exterior Improvements

32 01 02 **SITEWORK DEMOLITION AND REMOVAL** **2**

Division 33 - Utilities

33 05 13 **MANHOLES AND STRUCTURES** **3**

33 21 00 **WATER SUPPLY WELLS** **3**

33 41 13 **PUBLIC STORM UTILITY DRAINAGE PIPING** **4**

33 56 13 **ABOVEGROUND FUEL STORAGE TANKS** **3**

33 65 76 **DIRECT BURIED UNDERGROUND CABLE DUCTS** **2**

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1 General

1.1 CONTRACT #1 - LIST OF DRAWINGS

.1	C1-101	EXISTING SITE PLAN
.2	C1-102	NEW SITE PLAN
.3	C1-103	DETAILS AND NOTES
.4	C1-104	SITE DETAILS
.5	S1-101A	FOUNDATION PLAN - DEPOT BUILDING
.6	S1-101B	FOUNDATION PLAN, SECTIONS, DETAILS & NOTES - WAREHOUSE BUILDING
.7	S1-102A	SECTIONS & DETAILS - DEPOT BUILDING
.8	S1-103A	DETAILS & NOTES - DEPOT BUILDING
.9	M1-100	MECHANICAL SITE PLAN
.10	M1-101	MECHANICAL FUEL TANK RELOCATION & DETAILS
.11	M1-102	MECHANICAL DETAILS
.12	E1-101	ELECTRICAL SITE PLAN, LEGEND, TRENCH DETAILS & ELECTRICAL ROOM LAYOUT

END OF SECTION

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1 General

1.1 APPENDICES

.1 Geotechnical Investigation Report prepared by EastTech Consultant, dated Sept. 27, 2021

END OF SECTION

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1 General

1.1 SUMMARY OF WORK

.1 The project involves the construction of concrete foundation for the addition to the existing Maintenance Building and Warehouse (located in Bridgetown,PE), select site work and site services as indicated.

.2 All in accordance with the requirements of the specifications and drawings listed on their respective Index of Specifications and Drawings.

1.2 ENQUIRIES

.1 Direct all inquiries during the tender period to:

Coles Associates Ltd.
Attention: Mr. Nazmi Lawen
85 Fitzroy Street, Suite 201
Charlottetown, PE, C1A 1R6
Phone: 902-368-2300
Email: nlawen@colesassociates.com
CC: tellsworth@colesassociates.com

.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:

.2 Bidders for the work of the Civil, Mechanical and Electrical subcontracts will submit their tenders directly to the General Contract bidders, for incorporation by the General Contractors into their General Contract tenders.

.3 General Contract bidders shall take particular care to ensure that their tender is submitted on the proper tender form.

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 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 There will be a schedule Bidder's tour, date as stated in the timing requirements.

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, User Groups or Consultant will not be responsible for verbal instructions.

.5 Addenda will be posted online via https://www.princeedwardisland.ca/en/tenders.

.6 Every effort will be made to issue addenda not less than two (2) 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 The term "Own Forces," as a subcontractor, may be used by a Bidder where the Bidder is equipped to and in fact normally carries out the trade work using employees in the direct employment of the Contractor or a wholly owned subsidiary company. Other designations such as "Own Estimate" are unacceptable and may be cause for rejection of the tender by the Owner.

.7 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.

.8 A Bidder, whose tender is accepted, that included "Own Forces" for a subcontract will if requested, provide the Owner with payroll records verifying that the employees carrying out the "Own Forces" subcontract work are direct employees of the Contractor or of a wholly owned subsidiary company of the Contractor.

.9 Each bidder shall be prepared, if so requested by the Owner, prior to the award of the Contract to present evidence of his experience, qualifications and financial ability to carry out the terms of the Contract.

.10 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.

.11 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.

.12 Bidders are to complete any other appendices forming part of the Tender Form as directed under Section 00 41 13 - Bid Form.

.13 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.

.14 Envelope to be addressed to the recipient of tenders indicated in the Invitation to Tender and delivered by hand, registered mail or courier.

.15 Submit one (1) only signed copy of Tender Form.

.16 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.

.17 Tender forms and securities must bear original signatures.

.18 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 GUARANTEE

.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), including Civil, Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount. OR

.2 A security Deposit equal to at least ten percent (10%) of the tender amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Civil, Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount and a Labour and Materials Payment Bond in the amount of fifty percent (50%) of the total contract amount.

.3 All Bonds and Letters of Surety supplied by General Contractors, made payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.

.1 Bonds and Letters of Surety supplied by the General Contractor to the Owner shall be from a recognized surety company, satisfactory to, and approved by the Owner.

.2 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 criteria.

.3 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a credit Union, payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure. OR

.4 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 Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, 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 Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, pursuant to the Domestic Bonds of Canada Regulations.

.5 Security deposits submitted by subcontractors, to General Contractors, shall be in a form satisfactory to the General Contractor.

1.10 CONTRACT SECURITY

.1 Upon award of a contract the General Contractor is to provide the following contract security:

.1 General Contract Tender less than Three Million Dollars ($3,000,000.00), including Civil, Mechanical and Electrical Subcontract values:

.1 A Performance Bond in the amount of fifty percent (50%) of the total contract amount. OR

.2 A Security Deposit in an amount equal to at least ten percent (10%) of the contract amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Civil, Mechanical and Electrical Subcontract values:

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total contract amount.

.3 All Bonds provided by General Contractors, made payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.

.1 Bonds shall be from a recognized surety company, and approved by the Owner.

.2 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 criteria.

.4 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a Credit Union, payable to Minister of Finance, Province of Prince Edward Island. OR

.5 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 Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, 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, OR

.4 Contract security shall be provided at the expense of the Contractor, bonds shall be provided by an established surety company satisfactory to, and approved by the Owner. Certified Cheques or Bank Drafts shall be drawn on an account with a recognized financial institution.

.6 If in accordance with the Bid Guarantee requirements the successful Contractor has used a Certified Cheque or Bank Draft as a bid guarantee, the Certified Cheque or Bank Draft will be securely retained and, subject to the progress of the work being acceptable to the Owner and Consultant, will be held without interest until the date of Substantial Performance for the Contract, as defined under Definition 19 of CCDC2-2008, at which time it will be returned to the Contractor.

1.11 RECEIPT AND OPENING OF BIDS - UPDATED FOR COVID 19

.1 We have developed modifications to the tender process to minimize everyone's potential exposure to COVID-19.

.1 Sealed tenders will be received at the Security Desk located at the main entrance to the Jones Building, 11 Kent Street, Charlottetown, PE, C1A 7N8 until 2:00 PM, local time, on date of Tender closing .

.2 Sealed tenders are to be clearly marked with the Bidder's Name and the Project Name.

.3 Tender documents will need to be received prior to 2:00 PM local time on the date specified in the Tender. No submission will be accepted after that time.

.4 Amendments to submitted offer will be permitted if received in writing prior to bid closing and if endorsed by same party or parties who signed and sealed offer. Amendments may be submitted by fax to Department of Transportation & Infrastructure, fax number (902) 569-0590.

1.12 ADJUSTMENT AND WITHDRAWAL OF BIDS

.1 Bids may be withdrawn or adjusted in writing by mail, delivered in person 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 Department of Transportation & Infrastructure, fax number (902) 569-0590, 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 ACCEPTANCE / REJECTION OF TENDERS

.1 Bids shall remain open to acceptance and irrevocable for a period of thirty (30) days after the bid closing date.

.2 The Owner reserves the right to reject any and all tenders.

.3 In making the decision to award the Contract pursuant to this invitation to tender, the Owner may take into account:

.1 The history of work performance of each Bidder on similar or different types of work in prior Contracts with the Owner.

.2 The Bidder's qualifications to perform the work, the quality of the Bidder's past work, the Bidder's financial capability to do the work, the past history of the Contractor's construction scheduling ability to meet the Owner's specified substantial completion targets and the competence of the Bidder.

.4 If the tender is accepted the Contract will be awarded as promptly after the opening of bids as is possible. The selection of the tender that is accepted shall be at the sole discretion of the Owner.

.5 Each Bidder shall be prepared, if so requested by the Owner, prior to the award of the Contract to present evidence of their experience, qualifications and financial ability to carry out the terms of the Contract.

1.15 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.

1.16 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.

1.17 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.

1.18 COVID-19

.1 The parties acknowledge that the obligations of each party from time to time to meet certain terms and conditions of this Contract, may be impeded by the COVID-19 pandemic and related issues. The parties agree to act in good faith by making all reasonable accommodations as the circumstances of the pandemic may require and each party will exercise reasonable efforts to comply with this Contract notwithstanding the effect of the pandemic. No party will require or encourage any person acting on its behalf to violate the terms of any public health directive or to perform any act which would place such person at a material risk of contracting the COVID-19 virus.

.2 This contractor acknowledges that any costs associated with COVID-19 construction protocol related to all required Health and Safety measures during the duration of this construction contract, as referenced in the Tender Documents, shall be included in the base bid for this Contract.

.3 COVID-19 Implications:

.1 Until further notice, and as directed by the Provincial Chief Public Health Office (CPHO), all works shall be conducted with the intent and spirit of the health directives given. As such, bidders shall include provisions within their bids to achieve social and physical distancing between all workers during travel times to and from the site, working, rest breaks, lunch breaks, etc. For more information related to CPHO and COVID-19 refer to the following links provided by the Government of PEI:

.1 Government of PEI: www.princeedwardisland.ca/covid19

.2 Government of Canada: www.canada.ca/coronavirus

.3 CAPEI: www.capei.ca/

.4 In response to the current COVID-19 pandemic we will require all Contractors to:

.1 Develop a written work site specific Pandemic Preparedness plan based on the criteria in the CAPEI industry guide "PANDEMIC PLANNING FOR THE CONSTRUCTION INDUSTRY - A GUIDE" found at the following link: https://capei.ca/member_access/LiveEditor/images/pdf/INDUSTRY_GUIDE_COVID_19.pdf

.5 The successful Contractor shall have designated an on-site staff person with the authority to enforce the requirements of the 'Pandemic Preparedness Plan' throughout the project(s) or until such directive is deferred by the Chief Provincial Health Office (CPHO). The Owner will require that the Contractor develop a written site specific Pandemic Preparedness Plan and have it available upon award of this tender.

1.19 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.

1.20 COMPLIANCE WITH STATUTES

.1 It shall be the sole responsibility of the Contractor to prepare and submit any required applications, reports, payments or contributions with respect to Sales Taxes, Income Taxes, Canada Pension Plan contributions, Employment Insurance Premiums, Harmonized Sales Taxes or any other similar matter which may be required by law to be made by the Contractor in connection with the services to be performed under this Agreement.

.2 The Agreement shall be interpreted and applied in accordance with the laws, and in the courts, of the Province of Prince Edward Island.

.3 The Contractor agrees to accept sole responsibility to comply with all federal, provincial and municipal legislation which may have application to the Work and agrees to comply with all provincial and federal legislation affecting conditions of work and wage rates including the Employment Standards Act R.S.P.E.I. 1988, Cap. E-6.2, the Workers Compensation Act R.S.P.E.I. 1988, Cap. W-7.1, or any other laws that impose obligations in the nature of employers' obligations. The Consultant agrees to follow the Public Service Commission Human Resource Policies listed below while working on Government sites, in Government vehicles or alongside Government staff.

.1 Prince Edward Island Public Service Commission, Human Resource Policies

.1 Violence in the Workplace Policy
https://psc.gpei.ca/sites/psc.gpei.ca/files/HRPolicy/HRManual_9.05.pdf

.2 Drug, Alcohol and Medication Policy
https://psc.gpei.ca/sites/psc.gpei.ca/files/9.08%20AlcoholDrugandMedicationPolicy.pdf

.3 Policy for the Prevention and Resolution of Harassment in the Workplace
https://psc.gpei.ca/files/PDF%20Files/hrp-manual/hrppm_11.01.pdf

.4 The Contractor, before undertaking any Work shall provide to Government either a certificate of good standing by the Workers Compensation Board or written confirmation from the Workers Compensation Board that such certificate is not required.

.5 The Contractor agrees to accept the full cost of doing those things required under this paragraph and will not charge or seek reimbursement from Government in any way, such costs having been taken into consideration and included in the rates of payment stipulated in the Payments, Records and Accounts section of this Agreement.

1.21 TAXES

.1 The Harmonized Sales Tax (HST) shall be EXCLUDED from the tender amount. The Contractor, as per current Provincial Regulations, shall include on all invoices the Harmonized Sales Tax (HST) as an additional line item. This would be in addition to the tender amount which does not include HST.

.2 Vendors are required to charge HST on invoices to Province of PEI Departments, Agencies, Crown Corporations, and Regional Health Authorities.

1.22 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.

1.23 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.

1.24 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.

1.25 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.

1.26 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.

1.27 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 Not withstanding 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.

1.28 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.

1.29 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.

1.30 TIMING REQUIREMENTS

.1 This project will require the achievement of the following project milestones.

.1	Tender Call	**07 OCT 2021**
.2	Pre-Tender Site Meeting	**19 OCT 2021 @ 09:00 AM** Note: Contractors are asked to meet at Kings County Highway Depot in Bridgetown, PE
.3	Tender Close	**28 OCT 2021 @ 2:00 PM** Note: Location of Closing is Jones Buidling, 11 Kent Street, Charlottetown.
.4	Tender Award	**08 NOV 2021**
.5	Construction Start	**Immediately following Award.**
.6	Substantial Completion	**31 JAN 2022**

END OF SECTION

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1 General

1.1 TENDER

.1 SUBMITTED BY:

_____(Name)

_____(Address)

_____(Contact)

DATE: _____

FOR: PROJECT NAME: Kings County Highway Depot
Contract #1 - Sitework & Foundation
LOCATION: Bridgetown, PE

TO: PROJECT OWNER: Goverment of Prince Edward Island, as represented by the Minister of Transportation & Infrastructure
LOCATION: 11 Kent Street, 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: Kings County Highway Depot
Contract #1 - Sitework & Foundation
LOCATION: Bridgetown, 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 with 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.

1.4 DOCUMENTS ACCOMPANYING BID FORM

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

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.

Clearing & Grubbing: _____

Site Demolition: _____

Building Foundation: _____

Site Services
(Water, Sanitary & Storm Sewer) _____

Excavation & Backfilling Work: _____

Plumbing: _____

Electrical: _____

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	_____	$ _____
.2	_____	$ _____
.3	_____	$ _____
.4	_____	$ _____

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

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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 Government of Prince Edward Island as represented by the Minister of Transportation and Infrastructure.

.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 ten (10) 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 ten (10) times the value of the defective or unacceptable Work, or ten (10) 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 ***PEI TIE PROJECTS*** 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-Builts) 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 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 less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders.

.8 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 GC6.3 CHANGE DIRECTIVE

.1 Delete Paragraphs 6.3.6.1, 6.3.6.2 and 6.3.6.3 and replace with the following.

.2 The Owner or the Consultant, without invalidating the contract, may make changes by altering, adding to, or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the Contract.

.3 Where work is required to proceed immediately, work may proceed under a Change Directive. The Contractor will be instructed to proceed on a time and materials basis and maintain accurate accounting records for the cost of the change.

.4 Change Directives calling for changes 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.

.5 Each Change Directive will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.

.6 To these prices, the Contractor will add:

.1 For Work less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be included in the labour changes for a Change order.

1.16 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.

1.17 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"...

1.18 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 The Contractor shall apply for, obtain and pay for the building permit.

1.19 INSURANCE

.1 Without restricting the generality of GC 12.1 - INDEMNIFICATION, the Contractor shall provide, maintain and pay for the following insurance coverages:

.1 General liability insurance with limits of at least FIVE Million Dollars ($5,000,000.00) in the name of the Contractor and include, or in the case of a single, blanket policy, be endorsed to name, the Owner and the Consultant as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the Contractor with regard to the Work. General liability insurance shall be maintained from the date of commencement of the Work until one year from the date of Substantial Performance of the Work. Liability coverage shall be provided for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis for a period of 6 years following Substantial Performance of the Work.

.2 Automobile Liability Insurance with limits of at least TWO Million Dollars ($2,000,000.00) from the date of commencement of the Work until one year after the date of Substantial Performance of the Work.

.3 Aircraft or Watercraft Liability Insurance with limits of at least FIVE Million Dollars ($5,000,000.00) when owned or non-owned aircraft or watercraft are used directly or indirectly in the performance of the Work. The term Aircraft includes drones and other unmanned aircraft.

.4 Broad Form" property insurance (also known as Builders Risk) in the joint names of the Contractor, the Owner and the Consultant. The policy shall include as insureds all Subcontractors. The "Broad Form" property insurance shall be provided from the date of commencement of the 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 such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the Work

.3 When left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more that 30 consecutive calendar days.

.5 Boiler and machinery insurance in the joint names of the Contractor, the Owner and the Consultant. The policy shall include as insureds all Subcontractors. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of Substantial Performance of the Work. The policies shall include any periods of testing prior to full acceptance of the project as required by this Contract, but including coverage for risks arising out of such part of the Work. Coverage to extend to 36 months after the date of Final Completion of the last component of the project.

.6 The "Broad Form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. In the event of loss or damage:

.1 The Contractor shall act on behalf of the Owner for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such reasonable extension of Contract Time relative to the extent of the loss or damage as the Consultant may recommend in consultation with the Contractor.

.2 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds in accordance with the progress payment provisions. In addition the Contractor shall be entitled to receive from the payments made by the insurer the amount of the Contractor's interest in the restoration of the Work; and to

.3 The Work arising from the work of the Owner, the Owner's own forces or another contractor, the Owner shall, in accordance with the Owner's obligations under the provisions relating to construction by Owner or other contractors, pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and as in accordance with the progress payment provisions

.7 The insurer shall acknowledge that the policies are primary and any other insurance policies that may be in effect or any other sources of recovery the including 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.

.2 Prior to commencement of the Work and upon placement, renewal, amendment, or extension of all or any part of the insurance, the Contractor shall promptly provide the Owner with confirmation of coverage in the form of certificates of insurance by an authorized representative of the insurer together with copies of any amending endorsements applicable to the Work.

.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the Contract.

.4 If the Contractor fails to provide or maintain insurance as required by the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence to the Contractor and the Consultant. The Contractor shall pay the cost thereof to the Owner on demand or the Owner may deduct the cost from the amount which is due or may become due to the Contractor.

.5 All required insurance policies shall be with insurers licenced to underwrite insurance in the jurisdiction of the Place of Work.

.1 The Contractor shall indemnify and hold harmless the Government of Prince Edward Island, its agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings of every nature and kind whatsoever arising out of or resulting from the performance of work (herein called the "claims"), provided that any such claim is caused in whole or in part of any act, error or omission, including but not limited to those of negligence of the Contractor, or anyone directly or indirectly employed by the Contractor anyone for whom the Contractor may be liable.

1.20 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

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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 building components is mandatory.

.3 Where work must be modified or reinstalled to be properly coordinated, the cost to do so will be paid by the Trades involved. The Owner will not pay for uncoordinated work nor will the Owner pay to resolve uncoordinated work.

.4 If resolution cannot be achieved among the involved Trades, the Construction Manager and Consultant will assess Trade involvement and assign costs accordingly.

1.4 DAMAGE

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

.2 The Owner will not participate in paying for such damage.

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 EMERGENCIES

.1 The Consultant has authority in an emergency to stop the progress of the work whenever in his or her opinion, such stoppage may be necessary to ensure the safety of life, or of the structure, or neighbouring property. This includes authority to make such changes and to order, access and award the cost of such work extra to the Contract or otherwise as may in his or her opinion be necessary.

1.8 WORK SEQUENCE

.1 Construct Work to accommodate Owner's continued use of existing premises during construction.
.2 Coordinate Progress Schedule referred to in Section 01 32 16 - Construction Progress Schedule and coordinate with Owner Occupancy during construction.
.3 Construct Work to provide for continuous public usage. Do not close off public usage of facilities.
.4 Maintain fire access/control.

1.9 PARTIAL OWNER OCCUPANCY

.1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work.
.2 Execute Certificate of Substantial Performance for each designated portion of Work prior to Owner occupancy. Contractor shall allow:
  .1 Access for Owner personnel.
  .2 Use of parking facilities.
  .3 Operation of HVAC and electrical systems.
.3 On occupancy, Owner will provide for occupied areas:
  .1 Operation of HVAC and electrical systems.
  .2 Maintenance.
  .3 Security.

1.10 EXECUTION

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises.
.2 Elevators may be used for moving workers and material.
  .1 Protect walls of passenger elevators, to approval of Consultant prior to use.
  .2 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.11 MITIGATION OF IMPACT ON EXISTING BUILDING

.1 This Contractor will recognize that the existing facility must remain fully functional with minimal disruption during the course of the Work, and that the existing facility, its operation, and its occupants may be very sensitive to dirt, dust, air-borne particulate, smoke, fumes, etc. generated as a result of the Work. Any disruption in services must be brought to the attention of the Consultant and receive prior approval before commencement.
.2 This Contractor is responsible to ensure that the existing building is kept free from any contamination that may result from any of the Work.
.3 The life safety and security systems in the existing building are required to remain functional during construction. This Contractor is responsible to ensure that such systems are not inadvertently activated or deactivated during construction.

.4 The Contractor is financially responsible for all measures required to minimize the potential for any contamination that could occur. Such measures include, but are not limited to, temporarily masking sensors in non-occupied areas, providing fans, working off hours (nights), performing work outside, sealing off localized work areas, etc. All such measures to be confirmed and approved by the Consultant prior to undertaking.

.5 The scheduling of all Work, which has the potential to cause contamination to the existing building, is to be approved by the Owner.

.6 This Contractor is responsible to immediately mitigate any discomfort, disruption, damage or condition, to the existing occupants, operations, space or building systems as deemed necessary by the Consultant.

1.12 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.

1.13 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.

1.14 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.

1.15 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 NBC (2015) and all other applicable Provincial codes or regulations.

.5 The latest edition of the Canadian Electrical Code shall govern all electrical work, whether pre-wired and/or assembled remote from the site or not.

.6 All equipment supplied or installed shall be CSA approved for the intended use.

.7 The latest edition of the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.

.8 Provide a copy of all certificates of acceptance issued by Provincial or local authorities.

1.16 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.

1.17 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.

1.18 PROJECT MEETINGS

.1 Hold weekly 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.

1.19 OWNER'S SITE INSPECTOR (PEITPW PROJECTS ONLY)

.1 There will be an Inspector representing the Department of Transportation and Infrastructure, Province of PEI. No work is to be covered without having received approval from the Inspector. The Inspector 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 Department and approval granted to resume when a satisfactory solution has been found out.

.3 The Inspector 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 Inspector does not reject any work shall not remove the irresponsibility for completing all work as specified from the Contractor.

1.20 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.

1.21 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.

1.22 CONCEALMENT

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

1.23 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.

1.24 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 Includes all cutting and patching in building for connection of new mechanical and electrical services to service lines.
.2 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

1.25 BLOCKING AND BACKING

.1 Provide all blocking, backing, hangers, etc. used for support of all built-in work.

1.26 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 temporary services when directed by Consultant to maintain critical building and tenant systems.
.7 Provide alternative routes for personnel and vehicular traffic.
.8 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by Authorities Having Jurisdiction.
.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.27 ACCESS AND SECURITY

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

1.28 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.

1.29 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 mechanical commissioning, electrical commissioning, mechanical operation & maintenance manuals and electrical operations ' 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 PROGRESSIVE RELEASE OF HOLDBACK [IF CONTRACT IS SETUP TO DO SO]

.1 Where legislation permits, if Consultant has certified that Work of subcontractor or supplier has been performed prior to Substantial Performance of Work, Owner shall pay holdback amount retained for such subcontract Work, or products supplied by such supplier, on day following expiration of holdback period for such Work stipulated in lien legislation applicable to Place of Work.

.2 Notwithstanding provisions of preceding paragraph, and notwithstanding wording of such certificates, ensure that such subcontract Work or products is protected pending issuance of final certificate for payment and be responsible for correction of defects or Work not performed regardless of whether or not such was apparent when such certificates were issued.

1.9 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

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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 conveying systems, 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 Testing of all soil material types at source, including collection of sample material by testing firm, to verify compliance with material specifications.

.2 Follow up testing of all soil material types delivered to site.

.3 Monitoring placement and verifying compaction densities.

.4 Monitoring of upgrading work.

.5 Verifying the new compaction densities.

.6 Concrete:
- .1 Slump tests.
- .2 Compressive strength tests.

.7 Asphalt Paving (where applicable):
- .1 Review of asphalt mix design submitted by Contractor.
- .2 Monitoring placement and compaction of base and seal courses.
- .3 Testing of asphalt for compliance with material specifications from asphalt core samples taken by testing firm.

.8 Torquing of Structural Steel Bolted Connections (where required):
- .1 If tension control bolts (TCB) not used.
- .2 Random testing of torqued bolted connections.

.9 Testing work may occur under various Sections of the Specification.

1.4 OWNERS RESPONSIBILITIES: TESTING REQUIREMENTS

.1 Testing of the following will be undertaken and paid for by the Owner.
- .1 Concrete tests.
- .2 Soil compaction tests.
- .3 Compaction tests will be paid for by Consultant retained by Owner.
- .4 Asphalt tests.

1.5 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 DEFINITIONS

.1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart). A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: Original approved plan (for Project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: Number of work periods (not including holidays or other nonworking periods) required to complete an activity or other Project element. Usually expressed as workdays or workweeks.

.6 Master Plan: A summary-level schedule that identifies major activities and key milestones.

.7 Milestone: A significant event in Project, usually completion of major deliverable.

.8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: Overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

.1 Submit to Consultant within 5 working days of Award of Contract Bar (GANTT) Chart representing the project schedule as Master Plan for planning, monitoring and reporting of project progress.

1.4 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Consultant will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Excavation.
.6 Backfill.
.7 Building footings.
.8 Slab on grade.
.9 Structural Steel.
.10 Plumbing.
.11 Electrical.
.12 Testing and Commissioning.
.13 Supplied equipment long delivery items.
.14 Owner supplied equipment required dates.
.15 Substantial Completion.
.16 Deficiency Completion.
.17 Submittal.
.18 Total Completion.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
.2 Weather related delays with their remedial measures will be discussed and negotiated.

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 ITEM/ SHOP DWG ORDER ITEM NUMBER EQUIP DEL DATE DATE 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

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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 (including any amendments to and regulations).
.4 CSA C22.1-18 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.5 CSA C22.3 No. 7-94 (R2005) - Underground Systems
.6 COSH, Canada Occupational Health and Safety Regulations (SOR/86-304)
.7 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.(or latest edition)
  .2 FCC No. 302 - June 1982 Standard for Welding and Cutting. (or latest edition)

1.2 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, Occupational Health and Safety Act Regulations PEI (including any amendments to and regulations).
.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
.3 Perform lockouts in compliance with:
  .1 Canadian Electrical Code
  .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
  .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
.4 In event of conflict between any provisions of above Authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Consultant will advise on the course of action to be followed.

1.3 CONSTRUCTION SAFETY MEASURES

.1 Observe and enforce construction safety measures required by latest National Building Code, Part 8, Provincial Government, Worker's Compensation Board and municipal statues and authorities.
.2 Provide and maintain first aid equipment appropriate to the work and its location in accordance with the First Aid Regulations. Implement recommendations from Occupational Health and Safety Division specific to the project work site.
  .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
  .2 Having working knowledge of occupational health and safety 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.

1.4 HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
  .1 Have minimum 2 years site-related working experience specific to activities associated with Construction.
  .2 Having working knowledge of occupational health and safety 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.

1.5 SAFETY ASSESSMENT

.1 Perform site specific 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.

1.6 SUBMITTALS

.1 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the site-specific Health and Safety Plan.
.2 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the Contractor's authorized representative's worksite health and safety inspection reports.
.3 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the construction safety tool box meetings and formal contractor safety meetings.
.4 In the event of an incident/accident, immediately submit to the Consultant one copy electronically and one hard copy of the incident/accident report.

1.7 SITE CONTROL AND ACCESS

.1 Control worksite 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 areas(s) as being "off limits" to non-authorized persons. Signage must be professionally made.
.5 Ensure persons granted access is fitted and wear appropriate personal protective equipment (PPE).

1.8 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.
.2 Provide safety barricades, lights and signage within work site as required to provide a safe working environment for workers.

1.9 MEETINGS

.1 Prior to commencement of work hold a Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.2 Provide site safety orientation session to all workers and 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 site safety rules in force at site.

.3 Conduct site specific occupational health and safety meetings during the entire work as follows and submit minutes as requested.

- .1 Formal meetings on a minimum monthly basis.
- .2 Informal tool box meetings on a regular basis from a predetermined schedule.

.4 Attend Health and Safety meetings as directed by the Contractor.

1.10 HAZARDOUS MATERIALS

.1 Should material resembling hazardous materials (other than those identified within the Contract Documents) be encountered in the course of work, stop work immediately. Do not proceed until written instructions have been received from the Consultant.

.2 Any material which contains asbestos, lead paint or PCB's 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.

1.11 WHIMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) Regulations regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of Safety Data Sheets.

.2 Have a copy of WHMIS Safety Data Sheets available at the workplace on delivery of hazardous products.

1.12 SITE CLEANING

.1 Except where special permission is obtained, maintain clean access on public sidewalks and roads.

.2 Maintain walks and roads clear of construction materials and debris, including excavated material. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated material.

.3 Remove snow and ice from areas as required to execute the work.

1.13 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority. (latest editions)

.2 Implement and follow fire safety measures during Work. Comply with following:

- .1 National Fire Code, (latest edition)
- .2 Fire Protection Standards FCC 301 and FCC 302, (latest edition).
- .3 Federal and Provincial Occupational Health and Safety Acts and Regulations.0

.3 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirements, Consultant will advise on the course of action.

1.14 EMERGENCY MANAGEMENT PLAN

.1 Must include response for medical and fire emergencies.

.2 Know the location of the nearest fire alarm box and telephone (if no cell phone available), including the emergency phone number.

.3 Know where the "Civic Address" of worksite is posted to report to emergency personnel.

.4 Report immediately all fire incidents to the fire department as follows:
  .1 Activate nearest fire alarm box.
  .2 Telephone 911.
  .3 Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.
  .4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.
.5 Notify the Owner of any emergency.

1.15 POSTING OF DOCUMENTS

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

1.16 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.

1.17 OPEN EXCAVATIONS

.1 If open foundations or demolition areas are to be left at the end of a work day, a protective barrier must be placed around the entire perimeter of the open excavation or demolition areas to limit access by others. Barrier to be approved by the requirements established in the OH&S Regulations.

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. See Section 01 50 00 - Facilities and Controls for minimum type of barriers acceptable.

.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 temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.

.2 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.

.3 Use personal protection equipment as required by Occupational Health and Safety Act and as required by this site.

.4 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 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority.

.2 Enforce fire protection methods, good housekeeping and adherence to local and underwriter's fire regulations including, but not limited to, Fire Protection Act and the Provincial Building Code Act. Provide UL approved fire extinguishers, and other fire fighting services and equipment, except where more explicit requirements are specified as the responsibility of individual Sections.

.3 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code, 2010.

.2 Fire Protection Standards FCC 301 and FCC 302.

.3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Consultant will advise on the course of action.

.5 Advise the Fire Chief in the area of Work of any work that would impede fire apparatus response, including but not limited to violation of minimum overhead clearance prescribed by the fire chief, erecting of barricades and digging of trenches.

.6 Fire Separations:

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

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

.7 Ensure nothing subverts the integrity of fire protection provided for the building structure.

.8 Coordinate work of all sections so that they do not encroach on space required for fire protection and its installation. Ensure that fire protection damage during construction is totally replaced.

1.25 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut-off, unless approved by Consultant.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.26 FIRE SAFETY

.1 The Sub-Contractors are to participate on the Fire Safety Committee under the Joint Health and Safety Committee. The Fire Safety Committee under the direction of the Contractor is responsible for implementation and maintenance of the Construction Fire Safety Plan.

.2 Construction Fire Safety Plan:

.1 The Construction Fire Safety Plan will include the following:

.1 Introduction of plan and purpose

.2 Fire Safety Committee

.3 Terms of reference.
.2 Committee composition.
.3 Emergency Procedures.
.4 Fire protection equipment.
.5 Building description.
.6 Provisions for fire fighting.
.7 Portable extinguishers.
.8 Exits.
.9 Emergency Lighting.
.10 Reduced drawings.
.11 Fire safety maintenance schedule:
.1 General.
.2 Maintenance levels.
.3 Skill categories.
.4 Frequency.
.5 Checklists.
.12 Other information:
.1 Instruction on use of fire extinguishers.
.2 Emergency Fire Drill procedures.

.3 Portable Fire Extinguishers:
.1 During construction, Contractor is to provide and maintain on the site at all times, ULC listed 25 lb ABC dry chemical type portable fire extinguishers.

.4 Blockage of Roadways:
.1 The Fire Department shall be advised of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by the Fire Department, erecting of barricades and the digging of trenches.

.5 Rubbish and Waste Materials:
.1 Rubbish and waste materials are to be kept to a minimum.
.2 The burning of rubbish is prohibited.
.3 Removal:
.1 All rubbish shall be removed from the work site at the end of the workday or shift or as directed by Consultant.
.4 Storage:
.1 Extreme care is required where it is necessary to store oily waste in work areas to ensure maximum possible cleanliness and safety.
.2 Greasy or oily rags or materials subject to spontaneous ignition shall be deposited and kept in an approved receptacle and removed as required in 1.7.3.1.

.6 Flammable Liquids:
.1 The handling, storage and use of flammable liquids are to be governed by the current National Fire Code of Canada.
.2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 liters provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 liters for work purposes, requires the permission of the Fire Department.
.3 Transfer of flammable liquids having a flash point below 38ºC is prohibited within buildings.
.4 Transfer of flammable liquids shall not be carried out in the vicinity of open flames or any type of heat-producing devices.
.5 Flammable liquids having a flash point below 38ºC, such as naphtha or gasoline, shall not be used as solvents or cleaning agents.

.6 Flammable waste liquids, for disposal, shall be stored in approved containers located in a safe ventilated area. Quantities are to be kept to minimum and the Fire Department is to be notified when disposal is required.

.7 Fire Inspection:
- .1 The Fire Department shall be allowed unrestricted access to the work site.
- .2 The Contractor shall cooperate with the Fire Department during routine inspections of the work site.
- .3 The Contractor shall immediately remedy all unsafe fire situations observed by the Fire Department.

.8 Reporting Fires:
- .1 Know the location of the nearest fire alarm box and telephone, including the emergency phone number.
- .2 Report immediately all fire incidents to the fire department as follows:
  - .1 Activate nearest fire alarm box, or
  - .2 Telephone 911.
  - .3 Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.
  - .4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.27 WELDING AND CUTTING

.1 Use noncombustible shields for electric and gas welding or cutting executed within two (2) meters of combustible material or in occupied space.

.2 Place tanks supplying gases as close to work as possible. Fix in upright position, free from exposure to sun or high temperatures.

.3 Locate fire extinguishing equipment near all welding and cutting operations.

1.28 OPEN FLAMES, SPARKS, EXPLOSION PROTECTION

.1 Keep open flames and sparks to minimum. When flame or sparks are required, follow proper procedures to prevent fire or explosion.

1.29 HOT WORK AUTHORIZATION

.1 Hot Work will not be permitted on or within the building structure, tanks, or confined spaces, except as outlined herein.

.2 Obtain Consultant's written "Authorization to Proceed" before conducting any form of Hot work on site.

.3 To obtain authorization submit to Consultant:
- .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
- .2 Description of the type and frequency of Hot Work required.
- .3 Sample Hot Work Permit to be used. Shall be included in the safety documentation submission.

.4 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Consultant will provide authorization to proceed as follows:
- .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
- .2 Separate work, or segregate certain parts of work, into individual entities. Each entity requiring a separately written "Authorization to Proceed" from Consultant. Follow Consultant's directives in this regard.

.5 Requirement for individual authorization based on:
- .1 Nature or phasing of work;
- .2 Risk to Facility operations;

.3 Quantity of various trades needing to perform hot work on project or;
.4 Other situation deemed necessary by Consultant to ensure fire safety on premises.

.6 Do not perform any Hot Work until receipt of Consultant's written "Authorization to Proceed" for that portion of work.

.7 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Consultant. When directed, perform Hot Work only during non-operative hours of Facility. Follow Consultant's directives in this regard.

1.30 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Procedures to include:
- .1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
- .2 Use of a Hot Work Permit system for each hot work event.
- .3 The step by step process of how to prepare and issue permit.
- .4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or subcontractor to proceed with hot work.
- .5 Maintain a fire extinguisher in the immediate area where hot work is being undertaken.
- .6 Provision of a designated person to carryout a Fire Safety Watch for a minimum of 2 hours immediately upon completion of the hot work.
- .7 Compliance with fire safety codes and standards specified herein and Occupational Health and Safety regulations specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.

.4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:
- .1 Worker(s),
- .2 Authorized person issuing the Hot Work Permit,
- .3 Fire Safety Watcher,
- .4 Subcontractors and Contractor.

.5 Brief all workers and Subcontractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.
- .1 Failure to comply with the established procedures 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.

1.31 HOT WORK PERMIT

.1 Hot Work Permit to include, as a minimum, the following data:
- .1 Project name and project number;
- .2 Building name, address and specific room or area where hot work will be performed;
- .3 Date when permit issued
- .4 Description of hot work type to be performed;
- .5 Special precautions required, including type of fire extinguisher needed;
- .6 Name and signature of person authorized to issue the permit.
- .7 Name of worker (clearly printed) to which the permit is being issued.

.8 Time Duration that permit is valid (not to exceed 8 hours). Indicate start time & date and completion time & date.
.9 Worker signature with date and time upon hot work termination.
.10 Specified time period requiring safety watch.
.11 Name and signature of designated Fire Safety Watcher, complete with time & date when safety watch terminated, certifying that surrounding area was under his continual surveillance and inspection during the full watch time period specified in Permit and commenced immediately upon completion of Hot Work.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full and signed as follows:
.1 Authorized person issuing Permit before hot work commences;
.2 Worker upon completion of Hot Work;
.3 Fire Safety Watcher upon termination of safety watch;
.4 Returned to Contractor's Site Superintendent for safe keeping.
.5 The permit shall describe compliance with the following procedures. After tank or confined space interiors or building areas have been decontaminated, hot work may be conducted only when the tank or confined space is inverted. Hot work shall not be performed unless monitoring indicates atmospheres within and immediately surrounding are less than eight percent (8%) oxygen inside less than ten percent (10%) of the LFL outside; continuous monitoring shall continue until the hot work is completed. The hot work prohibition includes welding, cutting, grinding, sawing, or other similar operations which could be expected to potentially generate combustion-producing temperatures or sparks, or which could produce potentially hazardous fumes or vapours. An individual at each hot work site shall be designated as a fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to at least two (2) twenty (20) pound fire extinguishers located at each hot work site. All extinguishers shall be currently inspection tagged, approved safety pin and tamper resistant seal. A new permit shall be obtained at the start of each work shift during which hot work will be conducted.

1.32 BLASTING

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

1.33 POWER ACTUATED DEVICES

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

1.34 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.

1.35 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.

1.36 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.

1.37 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 indentified 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).

1.38 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.

1.39 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.

1.40 WORK PRACTICES AND ENGINEERING CONTROLS

.1 Access to work areas shall be regulated and limited to authorized persons. A daily roster shall be kept of persons entering such areas.

.2 Handling Contaminants and General Work Practices.

- .1 Transportation and handling of contaminants to meet applicable local, provincial and federal regulations.
- .2 Emergency respiratory equipment shall be located in readily accessible locations which will remain minimally contaminated with contaminants in an emergency.
- .3 Containers and systems shall be handled and opened with care. Approved protective clothing shall be worn by all employees engaged in regulated areas.
- .4 All wastes and residues containing contaminants shall be collected in appropriate containers.

.3 Confined or Enclosed Spaces

.1 Entry into confined or enclosed spaces, where there is limited egress, shall be controlled by a permit system. Permits shall be signed by an authorized representative of the employer and shall certify that appropriate measures have been taken to prevent adverse effects on the worker's health as a result of his or her entry into such space.

.2 Confined or enclosed spaces which have contained contaminants shall be thoroughly ventilated to assure an adequate supply of oxygen, tested for contaminants, and inspected for compliance with these requirements prior to each entry. Adequate ventilation shall be maintained while workers are in such spaces. Each individual entering such confined or enclosed space shall be furnished with appropriate personal protective equipment and clothing and be connected by a lifeline harness to standby worker stations outside of the space. The standby worker shall also be equipped for entry with approved personal protective equipment and clothing and have contact with a third person. The standby person shall maintain communication (visual, voice, signal line, telephone, radio, or other suitable means) with the employee inside the confined or enclosed space.

.3 Workers entering confined spaces and standby workers shall be trained at a recognized confined space training program.

1.41 PRE-CONSTRUCTION CONTRACTOR SAFETY CHECKLIST

.1 Use this text as a guideline for completing the following checklist. This checklist is a general, pre-construction review of the Contractor safety program, as well as an information session to identify what the Owner requires of the Contractor. Where the item requires a submission, ensure that it is received. If the item does not apply, enter N/A for not applicable.

.2 The following information will assist in establishing what will be reviewed in each section:

.1 Safety Policy: Each employer is required by law (in Prince Edward Island) to have a safety policy and program and to implement that policy. The Owner will ask for a copy of that program.

.2 Safety Representative: Each Contractor is required to advise the Owner who their safety representative is. That representative has duties as described in the Occupational Health and Safety Act.

.3 Emergency Procedure: Each Contractor must have a site specific layout and emergency plan complete with emergency phone numbers.

.4 Employee Orientation: Each and every person working for a Contractor, including Sub-Contractors, will be given an orientation to familiarize them with the site safety program. Unless otherwise specified, each Sub-Contractor is responsible for the orientation of their workers.

.5 Safe Work Plan: Most Contractors are involved in tasks that subject workers to hazards. In order to ensure that these workers are secured from hazard, the Contractor will supply the Owner with a written safe work plan which affords protection against the hazards. This plan must be signed by a company representative and communicated to the workers involved in the task.

.6 Personal Protective Equipment Review: Advise that all workers require CSA Class "B" hard-hat, CSA "Green Patch" (eight inch) footwear, eye, ear and respiratory protection as required (boots and hats at all times).

.7 Fall Protection: Fall restraint or fall arrest protection required where a fall of 2.4 meters or more is possible. NO EXCEPTIONS.

.8 Housekeeping: Advise of daily, or as needed, clean-up requirements.

.9 Tool Box Talks: Each Contractor is required to conduct weekly safety meetings with their forces and advise the Owner they have been done.

.10 Material Handling / Storage: Advise Contractor about storage areas and handling of material so as not to endanger their worker or another worker. Stacked material to be banded, chained, blocked or otherwise secured.

.11 Landing Platform: Advise Contractor about movement of material on or off platforms. All material to be secured. Platform gates or chains to be kept closed at all times workers are on platform. If not possible, worker to be tied off with fall restraint system independent of platform.

.12 WHMIS Training: Receive verification that all workers are trained and that the Contractor submits their MSDS.

.13 GFCI: Advise Contractor that all tools are required to have ground fault circuit interrupters (where electricity is supplied by Contractor).

.14 Accident Investigations: Any injury to any of their workers must be investigated and reported to the Owner.

.15 Verbal, Written, Gone: Explain Zero Tolerance Program.

.16 Joint / Worker Safety Committee: Sites of over 20 workers must establish a safety committee; over 50 workers, an additional worker committee. Workers required to attend committee meetings will do so and not be prevented by employers.

.17 Fire Protection: All trades involved in performing hot work of any kind are required to provide fire protection at the work location.

.18 Guardrails: Advise Contractor that where temporary removal guardrails required, guardrails must be replaced as soon as possible.

.19 First Aider: Each Contractor is required to have a first aid kit and trained first aider. Employer must name their first aider.

.20 Visitors: Advise Contractor that any visitors to site must be suitably protected from hazard. They must wear hard hat, safety vest, and proper safety footwear while on site.

.21 Task Lighting: Review responsibilities of task specific lighting (who provides it).

.22 Swamper / Rigger Competency: Where cranes are used, the Contractor must use a swamper / rigger. They shall provide the Owner with a written statement identifying, by name(s) their rigger and that the named person is a competent work as described in the Construction regulation.

.23 Scaffolds: Review scaffold building requirement: - Use all braces required by design. - Access ladder for platform over 1.5 meters. - Full width platform if height over 3 meters. PEI Regulations require double planks. - Tied in three time base dimension or use of outriggers. - Engineered over 16 meters in height (standard frame type).

.24 Elevating Work Platforms: - All boom and scissors lifts required to be CSA approved and have approval on machine. - Operators manual required on machine at all times. - Maintenance record on machine at all times. - Operator must receive training in operation of equipment. - Fall protection must be used at all times on a boom lift. - Fall protection required to be used on scissors lift when unit is being moved.

.25 Protruding Rebar:Installers of reinforcing steel must protect the protruding hazard or make arrangements to have it protected. Removal of protective coverings for task purposes only is allowed, however, protective covering must be replaced as soon as possible.

.26 WCB Clearance Certificates:Advise Contractor that the Owner will not release any funds for payment until Workers Compensation Board Clearance Certificate has been received by the Owner.

.3 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
.7 ____ Dust & Fumes
.8 ____ Fall Protection
.9 ____ Housekeeping
.10 ____ Tool Box Safety Talks (Weekly)
.11 ____ Material Handling / Storage
.12 ____ Landing Platforms
.13 ____ WHMIS Training Verification
.14 ____ GFCI Requirements
.15 ____ Accident / Incident Investigations Notification
.16 ____ Verbal, Written, Gone
.17 ____ Joint / Worker Safety Committee
.18 ____ Fire Protection
.19 ____ Guardrails
.20 ____ First Aider on Staff - Name Supplied
.21 ____ Visitors & Safety Equipment
.22 ____ Task Lighting
.23 ____ Swampers / Riggers Competency (in writing)
.24 ____ Scaffolds
.25 ____ Elevating Work Platforms
.26 ____ Protruding Rebar Protection - MSDS Received
.27 ____ 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 inside the building at any time or at any stage of construction.

1.8 ENVIRONMENTAL PERMIT APPROVAL

.1 Comply with requirements contained in the PEI Department of Transportation & Infrastructure Environmental Management Division's environmental approval permit for the project.

END OF SECTION

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1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2015 including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Demolition of spray or trowel-applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition work, immediately stop work and notify Consultant.

.2 Should material suspected of containing PCB's be encountered in the course of demolition work, immediately stop work and notify Consultant.

END OF SECTION

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1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract.

1.2 INSPECTION

.1 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
.4 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies are to be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.
.2 Provide equipment required for executing inspection and testing by appointed agencies.
.3 Employment of Inspection/Testing Agencies does not relax responsibility to perform Work in accordance with Contract Documents.
.4 If defects are revealed during inspection and/or testing, appointed agency may request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re inspection.

1.4 PROCEDURES

.1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
.2 Make good other Contractor's work damaged by such removals or replacements promptly.
.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Consultant.

1.6 REPORTS

.1 Submit 3 copies of inspection and test reports to Consultant.
.2 Provide copies to Subcontractor of work being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.
.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.8 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
.2 Construct in all locations acceptable to Consultant.
.3 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
.5 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
.6 Remove mock-up at conclusion of Work or when acceptable to Consultant.
.7 Mock-ups may remain as part of Work as directed by Consultant.

1.9 MILL TESTS

.1 Submit mill test certificates as requested.

1.10 EQUIPMENT AND SYSTEMS

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

END OF SECTION

1 General

1.1 SITE ACCESS AND PARKING

.1 The Consultant & Owner will designate Contractor's access to project site as well as parking facilities for equipment.
.2 Parking facilities at site is limited and cannot be used by Contractor. Make arrangements elsewhere for Contractor's vehicles including those of subcontractors and workers.
.3 Access to site will be from the main gate.
.4 The Contractor will maintain roads and sidewalks free from mud and debris tracked from construction site, on a daily basis, at no cost to Owner.
.5 The Contractor will provide snow removal within the site fence during period of work as required to maintain access to building, at no cost to the Owner.
.6 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.

1.2 SITE SAFETY FENCING

.1 Contractor to provide site safety fencing (orange snow fence) around entire construction site to separate construction zone from public / building users.
.2 Size of compound to be determined by Contractor, but must contain all construction and construction related activities within the compound, except parking for workers.
.3 Contractor to support fence with steel T bars driven into the ground. Space at 2400mm maximum.
.4 Contractor to post notices for both construction zone and personal protective equipment requirements.

1.3 PARKING

.1 Parking space for workers' vehicles will ___ not___be available on site under the Contractor's control.
.2 Parking for delivery and service vehicles for the supply and removal of construction materials and debris will be restricted to within the limit of contract and security fencing.

1.4 SNOW REMOVAL

.1 General snow removal to the building site inside Limit of Contract by the Contractor.
.2 All snow removal to access Contractor's construction trailers and storage, and to perform own work by the Contractor.

1.5 BUILDING ACCESS

.1 Use only access doors, and circulation routes and elevators within building as designated by Consultant to access interior work.

1.6 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.
.2 The Contractor will provide, at no cost to the Owner, an office heated to 22 C, lighted 750 Lx and ventilated, one space of sufficient size to accommodate site meetings for contractor, trades, consultant and owner. Site office to be furnished with meeting table and chairs, drawing laydown table, desk and storage space to accommodate documents required to be maintained on site. The use of the existing building is not acceptable.
.3 The Contractor will provide a cellular phone line for the site supervisor.
.4 Contractor's site office must be located within the limits of the contract. This area will also be the location for the site offices for all subcontractors.

1.7 TESTING AGENCY SITE OFFICE

.1 Not applicable.

1.8 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.
.2 Provide heat when materials being stored are subject to frost damage.
.3 Under no circumstances will Consultant accept materials damaged due to exposure to weather elements, for incorporation into construction. Consultant will determine what constitutes damaged material.
.4 All storage sheds or trailers must be located within the limits of the contract and/or temporary construction fence.

1.9 LAYOUT

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

1.10 MATERIAL STORAGE

.1 Locate site storage trailers where directed by Consultant. Place in location of least interference with existing facility operations.
.2 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.
.3 Make arrangements elsewhere in the City as deemed required and pay all costs for storage of materials not ready for incorporation into work.

1.11 REMOVAL OF TEMPORARY FACILITIES

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

1.12 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 municipal storm water system or water course.

1.3 WATER SUPPLY

.1 Water supply will be provided by the Owner for construction usage at no cost.

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. Facilities within the existing building are not available to the Contractor's work force.
.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 temporary construction fence, provided under the work of this Contract.

1.5 POWER

.1 Power supply will be provided by the Contractor for construction usage at no cost.
.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 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
.2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.
.3 Provide temporary heat and ventilation in enclosed areas as required to:
  .1 Facilitate progress of Work.
  .2 Protect Work and products against dampness and cold.
  .3 Prevent moisture condensation on surfaces.
  .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  .5 Provide adequate ventilation to meet health regulations for safe working environment.
.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
.4 Ventilate storage spaces containing hazardous or volatile materials.
.5 Ventilate temporary sanitary facilities.
.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, may be used when available. Be responsible for damage to heating system if use is permitted. Use of permanent system will not affect warranty.
.7 On completion of Work for which permanent heating system is used, replace filters.
.8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
.9 Pay costs for maintaining temporary heat, when using permanent heating system.
.10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform with applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct-fired combustion units to outside.
.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 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 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract.
.2 Canadian General Standards Board (CGSB)
  .1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
  .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.3 Canadian Standards Association (CSA International)
  .1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
  .2 CSA-0121-M1978, Douglas Fir Plywood.
  .3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.
  .4 CSA 5269.1-16, Falsework and Formwork.
.4 Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.

1.2 INSTALLATION AND REMOVAL

.1 Provide construction facilities in order to execute work expeditiously.
.2 Remove from site all such work after use.

1.3 OVERLOADING

.1 Ensure no part of work is subjected to a load that will endanger its safety or cause permanent deformation.

1.4 FALSEWORK

.1 Design and construct falsework in accordance with CSA s269.2.

1.5 SCAFFOLDING AND FALL ARREST

.1 Provide and maintain scaffolding.
.2 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CAN/CSA-S269.2.
.3 Erect scaffolding independent of walls. Remove when no longer required.
.4 Comply with the requirements of the Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.
.5 Each user of scaffolding shall examine scaffolding for sufficiency before using it. Make scaffolding secure or notify C

1.6 HOISTING

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
.2 Hoists and cranes shall be operated by qualified operator.
.3 Maintain current inspection certificate.
.4 Qualifications of crane operator must be submitted to Consultant for approval and must be authorized to operate the crane.

1.7 ELEVATORS

.1 Designated elevators may be used by construction personnel and transporting of materials. Co-ordinate use with Consultant.
.2 Provide protective coverings for finish surfaces of cars and entrances.

1.8 SITE STORAGE/LOADING

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

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

1.9 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

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

.3 Provide adequate weather tight, heat and ventilation appropriate for the use and storage of equipment, tools and materials.

.4 Each user of equipment or tools shall be appropriately trained and be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary, or notify the Contractor in writing that user will not commence work with such tools until it is made safe.

1.11 CONSTRUCTION SIGNAGE

.1 Provide and erect, within three weeks of signing Contract, a project sign in a location designated by Consultant.

.2 No other signs or advertisements, other than warning signs, are permitted on site.

.3 Provide project identification site sign comprising foundation, framing, and one 2.4m x 2.4m signboard as detailed and as described below.

.1 Foundations: 15 MPa concrete to CAN/CSA-A23.1 minimum 200 mm x 900 mm deep.

.2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.

.3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.

.4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CGSB 1-GP-189.

.5 Fasteners: hot-dip galvanized steel nails and carriage bolts.

.6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay.

.4 Locate project identification sign where directed and construct as follows:

.1 Build concrete foundation, erect framework, and attach signboard to framing.

.2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Color white on all signboard faces.

.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

.5 Signage:

_____
Image of Front Elevation
(Consultant to provide digital image to sign company - allow for 300 letters).

OWNER:
"Logo and Name"_____. (Allow for full company name)

CONSULTANT:
"Logo and Name "COLES ASSOCIATES LTD". (Allow for full company name)

SUB CONSULTANT
"Logo and Name" _____. (Allow for full company name)

SUB CONSULTANT
"Logo and Name"_____. (Allow for full company name)

GENERAL CONTRACTOR
"Logo and Name"_____. (Allow for full company name)

MECHANICAL SUBCONTRACTOR
"Logo and Name"_____. (Allow for full company name)

ELECTRICAL SUBCONTRACTOR
"Logo and Name"_____. (Allow for full company name)

.6 Signs and notices for safety and instruction shall be in English; Graphic symbols shall conform to CAN3-Z321.

.7 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Consultant.

END OF SECTION

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1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
  .1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
  .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.2 Canadian Standards Association (CSA International)
  .1 CSA-O121-M1978, Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.
.2 Remove from site all such work after use.
.3 Temp barrier for 01 50 00.

1.3 HOARDING

.1 Not applicable.

1.4 DUST CONTROL BARRIERS

.1 Provide full dust control barriers, sealed at floor, walls and underside of deck between renovation spaces and active areas.
.2 Barriers may be supported by telescopic poles where appropriate.
.3 Provide zippered access points.
.4 Provide tack mats at access points between construction zone and active building.
.5 Provide negative air machine to maintain negative pressure in construction zone exhausted to exterior.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, and other areas where a change in elevation of greater than 900mm exists.
.2 Provide as required by governing authorities.

1.6 ACCESS TO EXITS

.1 Maintain access to all existing exits at all times.

1.7 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
.3 Design enclosures to withstand wind pressure and snow loading.

1.8 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.
.2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
.2 Provide necessary screens, covers, and hoardings.
.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.
.4 Be responsible for damage incurred due to lack of or improper protection.

1.11 PROTECTION OF LANDSCAPE ELEMENT

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
.2 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

1 General

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 7 days of written request by Consultant, submit following information for materials and products proposed for supply:

- .1 Name and address of manufacturer.
- .2 Trade name, model and catalog number.
- .3 Performance, descriptive and test data.
- .4 Manufacturer's installation or application instructions.
- .5 Evidence of arrangements to procure.

.3 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

1.2 REFERENCE STANDARDS

.1 Conform to reference standards, in whole or in part as specifically requested in specifications.

.2 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.

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

1.3 CONFORMANCE

.1 When material or equipment is specified by standard or performance specifications, upon request of Consultant, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.4 SUBSTITUTION OF MATERIAL

.1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.

.2 Proposals will be considered by Consultant if:

- .1 Products selected by tenderer from those specified, are not available, or
- .2 Delivery date of products selected from those specified would unduly delay completion of Contract.
- .3 Alternative products to those specified, which are brought to attention of, and considered by Consultant as equivalent to those specified and will result in credit to Contract amount.
- .4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as a result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Consultant and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of Consultant.

1.5 QUALITY OF PRODUCTS

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

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.6 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
.2 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
.3 Decisions as to standard of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.7 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.8 TRANSPORTATION

.1 Pay costs of transportation and handling of products required in performance of Work.
.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor to unload, handle and store such products.

1.9 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
.3 Store products subject to damage from weather in weatherproof enclosures.
.4 Store cementitious products clear of earth or concrete floors, and away from walls.
.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
.9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.10 MANUFACTURER'S INSTRUCTIONS

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

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

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

1.11 CO-ORDINATION

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

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.12 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, color and finish as base metal in which they occur.

.2 Prevent electrolytic action between dissimilar metals.

.3 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.4 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.

.5 Keep exposed fastenings to minimum, space evenly and lay out neatly.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Obtain Consultant's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166-1975, and observe restrictions in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.13 FASTENINGS - EQUIPMENT

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

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and resilient washers with stainless steel.

1.14 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.15 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.16 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.17 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

END OF SECTION

1 General

1.1 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.2 SURVEY REFERENCE POINTS

.1 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
.2 Make no changes or relocations without prior written notice to Consultant.
.3 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
.4 Require surveyor to replace control points in accordance with original survey control.

1.3 SURVEY REQUIREMENTS

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
.2 Establish lines and levels, locate and lay out, by instrumentation.
.3 Stake for grading, fill and topsoil placement and landscaping features.
.4 Stake slopes and berms.
.5 Establish pipe invert elevations.
.6 Stake batter boards for foundations.
.7 Establish foundation, column locations and floor elevations.
.8 Establish lines and levels for mechanical and electrical work.
.9 At completion of work, provide a certified survey of as-built foundations and site work.

1.4 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Consultant.

1.5 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 approval for actual location.
.4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.
.5 Record locations of maintained, re-routed and abandoned service lines.

1.6 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.
.2 Record locations of maintained, re-routed and abandoned service lines

1.7 SUBSURFACE CONDITIONS

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

1.8 SUBMITTALS

.1 Submit name and address of Surveyor to Consultant.
.2 On request of Consultant, submit documentation to verify accuracy of field engineering work.
.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to the Contract Documents.

END OF SECTION

1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
.2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
.3 Provide on-site containers for collection of waste materials and debris.
.4 Provide and use clearly marked separate bins.
.5 Remove waste and debris from site and deposit in waste container at end of each working day.
.6 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
.7 Store volatile waste in covered metal containers, and remove from premises at end of each day.
.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 CLEANING DURING CONSTRUCTION

.1 Maintain work site in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
.2 Keep existing building entrances, corridors and stairwells used by workers in clean dust free condition at all times. Conduct thorough cleaning of these areas at end of each work shift.
.3 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
.4 Provide and employ dust barriers, dividers, seals on doors and other dust control measures as required to ensure dust and dirt generated by work are not transmitted to other existing areas of building. Should dust accidentally migrate into areas under use by building occupants or public, employ such means as may be necessary to immediately clean all contaminated surfaces within these area(s) to the satisfaction of the Consultant.
    .1 See Section 01 56 00 - Temporary Barriers and Enclosures for requirements on dust control and for erection of dust partitions.
.5 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from use by workers.
    .1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Consultant) and floor washing as necessary to thoroughly clean all soiled surfaces.

1.3 FINAL CLEANING

.1 Prior to final review, remove surplus products, tools, construction machinery and equipment.
.2 Remove waste products and debris.
.3 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
.4 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
.5 Remove dirt and other disfiguration from exterior surfaces.
.6 Clean and sweep roofs, gutters, area ways, and sunken wells.
.7 Sweep and wash clean paved areas.
.8 Remove snow and ice from access to construction.

END OF SECTION

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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 internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
  - .2 Field changes of dimension and detail;
  - .3 Location of all capped or terminated services and utilities.
  - .4 Chases for mechanical, electrical and other services;
  - .5 Ceiling and floor elevations;
  - .6 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
  - .7 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
  - .8 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
  - .9 Any details produced in the course of the contract by the Consultant to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document;
  - .10 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 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

.2 Contractor to provide the services of a professional surveyor to record as-built locations dimensions and finish levels of all site grades and services.

.3 Survey to be submitted prior to submittal of final invoice and within five days of completion. **Substantial Completion will not be declared without receipt of survey.**

1.4 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.

1.5 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 Organize and divide data into sections same as 16 division numerical order of contract specifications and thereafter subdivided into various equipment or building systems.

.6 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.

.7 Type lists and notes. Do not hand write.

.8 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.

.9 Materials and Finishes Maintenance Data:
.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and color and texture designations.
.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
.4 Additional Requirements: as specified in individual specifications sections.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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 Topographic Survey: provide detailed topographic survey of all work performed under this Contract, including site grades, foundation walls, utilities etc. To be provided in AutoCAD digital format.

.7 Other Documents: maintain manufacturer's certifications, required by individual specifications sections.

1.12 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.

1.13 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 RELATED REQUIREMENTS

.1 Section 03 20 00 - Concrete Reinforcing.
.2 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)
  .1 CAN/CSA-A23.1:19, Concrete Materials and Methods of Concrete Construction.
  .2 CAN/CSA-O86:19, Engineering Design in Wood (Limit States Design).
  .3 CSA O121-17, Douglas Fir Plywood.
  .4 CSA O151-17, Canadian Softwood Plywood.
  .5 CSA O153-13 (R2017), Poplar Plywood.
  .6 CAN3-O188.0, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.
  .7 CSA O437 Series-93 (R2013), Standards for OSB and Waferboard.
  .8 CSA S269.1-2016, Falsework for Construction Purposes.
  .9 CAN/CSA-S269.3-M92 (R2013), Concrete Formwork.
.2 Council of Forest Industries of British Columbia (COFI)
  .1 COFI Exterior Plywood for Concrete Formwork.

1.3 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework in accordance with Division 01 - General Requirements.
.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings.
.3 Indicate sequence of erection and removal of formwork/falsework as directed by Consultant.
.4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in the Province of Prince Edward Island, Canada.

1.4 QUALITY CONTROL

.1 Pre-Pour Meeting
  .1 Attend a quality control meeting including all relevant sub-trades to review the quality of the formwork, reinforcement installation, exposed concrete finishes, under slab services, pour sequence and related issues.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Place materials defined as hazardous or toxic waste in designated containers.
.5 Ensure emptied containers are sealed and stored safely for disposal.
.6 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.

.2 Tubular column forms: round, spirally wound laminated fiber forms, smooth, non patterned PVC internally treated with release material. Spiral pattern to show in hardened concrete.

.3 Form ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

.4 Form release agent: non-toxic.

.5 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.

.6 Falsework materials: to CSA-S269.1.

.7 Allow for sleeves through the foundation at locations to be as directed on site. Diameter and number of sleeves as indicated on drawings.

3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Obtain Consultant's approval for framing openings not indicated on drawings.

.3 Hand trim sides and bottoms of excavation and remove loose earth from earth forms before placing concrete.

.4 Fabricate and erect falsework in accordance with CSA S269.1.

.5 Do not place shores and mud sills on frozen ground.

.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.

.7 Align form joints and make watertight. Keep form joints to minimum.

.8 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.

.9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.12 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

3.2 REMOVAL

.1 Leave formwork in place for following minimum periods of time after placing concrete.

.1 72 hours for walls and sides of beams.

.2 72 hours for columns.

.3 28 days for beam soffits, slabs, decks and other structural members, or seven (7) days when replaced immediately with adequate shoring to standard specified for falsework.

.4 72 hours for footings and abutments.

.2 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.
.2 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

.1 American Concrete Institute (ACI)
  .1 ACI 315R-2018, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
  .2 American National Standards Institute/American Concrete Institute (ANSI/ACI)
    .1 ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement.
.2 American Society for Testing and Materials (ASTM)
  .1 ASTM A775/A775M-091c, Specification for Epoxy-Coated Reinforcing Steel Bars.
.3 Canadian Standards Association (CSA)
  .1 CAN/CSA-A23.1:19, Concrete Materials and Methods of Concrete Construction.
  .2 CAN3-A23.3:19, Design of Concrete Structures for Buildings.
  .3 CSA G30.3-M1983 (R1998), Cold Drawn Steel Wire for Concrete Reinforcement.
  .4 CSA G30.5-M1983 (R1998), Welded Steel Wire Fabric for Concrete Reinforcement.
  .5 CSA G30.14-M1983 (R1998), Deformed Steel Wire for Concrete Reinforcement.
  .6 CSA G30.15-M1983 (R1998), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
  .7 CAN/CSA-G30.18-09, (R2014) Billet-Steel Bars for Concrete Reinforcement.
  .8 CAN/CSA-G40.21 (R2018) Structural Quality Steels.
  .9 CAN/CSA-G164-2018, Hot Dip Galvanizing of Irregularly Shaped Articles.
  .10 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
.2 Upon request inform Consultant of proposed source of material to be supplied.

1.4 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Division 01 - General Requirements.
.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Consultant, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada, ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
.3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide type A tension lap splices where indicated.
.4 Each drawing submitted shall bear the signature and stamp of qualified professional engineer registered to practice in Prince Edward Island.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Consultant.
.2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
.3 Cold-drawn annealed steel wire ties: to CSA G30.3.
.4 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.
  .1 All 152 x 152 MW x 18.7 x 18.7
.5 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.
.6 Mechanical splices: subject to approval of Consultant.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. Manual of Engineering and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.
.2 Obtain Consultant's approval for locations of reinforcement splices other than those shown on placing drawings.
.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

3 Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Consultant.
.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
.3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
.2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
.3 Prior to placing concrete, obtain Consultant's approval of reinforcing material and placement.
.4 Ensure cover to reinforcement is maintained during concrete pour.
.5 Provide concrete half-bricks to support welded wire mesh in proper position in floor slabs during placing of concrete.
.6 Provide 20mm dowels into existing concrete slabs as noted on drawings between new and existing concrete work.

3.3 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishings of all equipment, labor and materials necessary for the provision of all concrete for the work of this project, which includes but is not necessarily limited to, the following:
  .1 All concrete work required for the footings, foundation walls and other building and site elements as indicated.

1.2 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.
.2 Section 03 20 00 - Concrete Reinforcing.
.3 Section 31 23 00 - Excavation and Fill.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)
  .1 ASTM C109/C109M-16, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).
  .2 ASTM C260-10a (2016), Specification for Air-Entraining Admixtures for Concrete.
  .3 ASTM C309-11, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  .4 ASTM C332-17, Specification for Lightweight Aggregates for Insulating Concrete.
  .5 ASTM C494-17, Specification for Chemical Admixtures for Concrete.
  .6 ASTM C827-16, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
  .7 ASTM C939-16a, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
  .8 ASTM D1751-04(2013), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
  .9 ASTM D1752-04a(2013), Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction.
.3 Canadian Standards Association (CSA)
  .1 CAN/CSA-A3000-18, Cementitious Materials Compendium.
  .2 CAN/CSA-A23.1:19, Concrete Materials and Methods of Concrete Construction.
  .3 CAN/CSA-A23.2:19, Methods of Test for Concrete.
  .4 CAN/CSA-A5, Portland Cement

1.4 CERTIFICATES

.1 Submit certificates in accordance with Division 01 - General Requirements.
.2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.5 TESTING AND INSPECTION

.1 Testing and inspection of concrete and concrete materials will be carried out by testing laboratory in accordance with Division 01 - General Requirements. Frequency of tests will be determined by the testing laboratory.
.2 Remove defective concrete and embedded debris and repair as directed by Consultant.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Division 01 - General Requirements.
.2 Pre-Pour Meeting
  .1 Convene a pre-pour meeting 2 weeks prior to beginning concrete works.
  .2 Ensure concrete forming, finishing and concrete supplier personnel, attend.
  .3 Verify project requirements.
  .4 Review all aspects of the work including construction sequence, access to work by other Contractors, quality of falsework for trueness to dimensions, quality of finish expected at exposed concrete and all other aspects of the work.
.3 Submit to Consultant, minimum four (4) weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
.4 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Consultant on following items:
  .1 Falsework erection.
  .2 Hot weather concrete.
  .3 Cold weather concrete.
  .4 Curing.
  .5 Finishes.
  .6 Formwork removal.
  .7 Joints.

1.7 ENVIRONMENTAL CONDITIONS

.1 Provide all protection during concrete placing and curing in hot and in cold weather, and to CAN/CSA-A23.1, Section 7.
.2 Prior to placing, ensure that all needed material and equipment is on hand, and obtain the Consultant's approval for particular methods to be used.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.
.2 Place in appropriate on-site bins in accordance with Waste Management Plan.
.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.
.4 Use excess concrete for: additional paving, post footing anchorage, swale rip-rap reinforcing, mud slab, flowable fill, retaining wall footing ballast, storm structure covers, underground utility pipe kickers, storm pipe flared end section, toe wash protection, shoulder and toe outfall restraints for temporary erosion pipes.
.5 Use trigger operated spray nozzles for water hoses.
.6 Designate a cleaning area for tools to limit water use and runoff.
.7 Carefully coordinate the specified concrete work with weather conditions.
.8 Ensure emptied containers are sealed and stored safely for disposal.
.9 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
.10 Choose least harmful, appropriate cleaning method which will perform adequately.

2 Products

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A5.
.2 Blended hydraulic cement: to CSA A362-98.

.3 Supplementary cementing materials: to CAN/CSA-A23.5.
.4 Cementitious hydraulic slag: to CAN/CSA-A363.
.5 Water: to CAN/CSA-A23.1.
.6 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
.7 Air entraining admixture: to CSA CAN3 - A 266.1
.8 Chemical admixtures: to CSA CAN3 - A 266.2 Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
.9 Shrinkage compensating grout: premixed compound consisting of metallic aggregate, Portland cement, water reducing and plasticizing agents.
  .1 Compressive strength: 50 MPa at 28 days.
  .2 Consistency:
    .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30s.
    .2 Flowable: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portion) 125 to 145%.
    .3 Plastic: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portions) 100 to 125 %.
    .4 Dry pack to manufacturer's requirements.
  .3 Net shrinkage at 28 days: maximum nil %.
.10 Curing compound: to CAN/CSA-A23.1 white and to ASTM C309, Type 1-chlorinated rubber. Coordinate with finish floor materials for compatibility.
.11 Premoulded waterstops: bentonite and polyethylene sandwich, minimum 19mm thickness x 25mm wide, water-activated, expanding type forming compression seal.
  .1 Acceptable Material:
    .1 Parastop.
    .2 Volclay Waterstop-RX.
    .3 Hydrotite.
.12 Ribbed waterstops: extruded PVC, 150mm long, flanges tapered 6.3mm to 9.5mm at center bulb with pre-welded corners and intersecting pieces to following properties:
  .1 Tensile strength: to ASTM D412, Die C method, minimum 11.4MPa.
  .2 Elongation: to ASTM D412, Die C method, minimum 275%.
  .3 Tear resistance: to ASTM D624, Die B method minimum 48 kN/m.
  .4 Acceptable Material:
    .1 R. Meadows Sealtight No. 6380.
    .2 CPD No. 5.
.13 Labyrinth waterstops: extruded PVC Arctic Grade of sizes indicated with prewelded corner and intersecting pieces.
  .1 Tensile strength: to ASTM D412, method A, Die "C".
  .2 Elongation: to ASTM D412, method A, Die "C", minimum 250%.
  .3 Tear resistance: to ASTM D624, method A, Die "B", minimum 30 kN/m.
.14 Premoulded joint fillers:
  .1 Bituminous impregnated fiber board: to ASTM D1751.
.15 Weep hole tubes: galvanized steel or plastic.
.16 Dampproofing:
  .1 Emulsified asphalt, mineral colloid type, unfilled: to CAN/CGSB-37.2, and to Section 07 11 13 - Bituminous Dampproofing.
.17 Polyethylene film: 6 mil and 10 mil thickness to CAN/CGSB-51.34.
.18 Joint Sealer: chemical curing, multi-component, Class B, Type I for horizontal joints, Type II for vertical joints to CAN/CGSB 19.24.
.19 The use of super plastizer for the structural slab and retaining wall is acceptable provided it meets the requirements of CAN/CSA-A23.1.

2.2 MIXES

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1 to give following properties:
- .1 Exterior Concrete Slabs:
  - .1 Cement: use Type 10 Portland cement.
  - .2 Minimum compressive strength at 28 days: 35 MPa.
  - .3 Class of exposure: C-2.
  - .4 Nominal size of course aggregate: 20 mm.
  - .5 Slump at point and time of discharge: 80 mm +/- 20.
  - .6 Air content: to Table 10.
- .2 Concrete footing and foundation wall:
  - .1 Cement: use Type 10 Portland cement.
  - .2 Minimum compressive strength at 28 days: 25 MPa.
  - .3 Class of exposure: F-2
  - .4 Nominal size of course aggregate: 20 mm.
  - .5 Slump at point and time of discharge: 80 mm +/- 20.
  - .6 Air Content: 4 to 7%.

.2 If requested by Consultant, provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CAN/CSA-A23.1.

.3 Use of calcium chloride not permitted.

2.3 ADMIXTURES

.1 Admixtures will be permitted only to correct deficiency in mixture or to make correct placement requirements as recommended by Testing Laboratory and approved by Consultant.

.2 Use of accelerating admixtures, if approved by Consultant, will not relax cold weather placement requirements of CAN/CSA-A23.1. Use of calcium chloride not permitted.

3 Execution

3.1 PREPARATION

.1 Obtain Consultant's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Pumping of concrete will be permitted. Place concrete in accordance with CAN/CSA-A23.1 to meet all requirements of mix design at point of placement.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 In locations where new concrete is doweled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout or as noted on drawings to anchor and hold dowels in positions as indicated.

.7 Do not place load upon new concrete until authorized by Consultant.

3.2 CONSTRUCTION

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

.2 Sleeves and inserts.
- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Consultant.

.2 Where approved by Consultant, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Consultant.
.3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Consultant before placing of concrete.
.4 Check locations and sizes of sleeves and openings shown on drawings.
.5 Sleeve, do not core required openings.

.3 Anchor bolts.
.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

.4 Drainage holes and weep holes:
.1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories.
.2 If wood forms are used, remove them after concrete has set.
.3 Install weep hole tubes and drains as indicated.

.5 Dovetail anchor slots:
.1 Install continuous vertical anchor slot to forms where masonry abuts concrete wall or columns.
.2 Install continuous vertical anchor slots at 800 mm oc where concrete walls are masonry faced.

.6 Dowels: In locations where new concrete is doweled to existing concrete drill holes in existing concrete to depths, diameters and spacing indicated and install dowels using natural aggregate grout mixed to flow consistency to suit application, in strict accordance with manufacturer's instructions or as noted on drawings.

.7 Placing Grout: Place shrinkage compensating grout under base plates for structural steel and other equipment, using procedures in accordance with manufacturer's recommendations, which result in 100%, contact over grouted area.
.1 Refer to structural drawings for thickness and edge profile of grout under base plate for structural steel.

.8 Finishing.
.1 Finish concrete to CAN/CSA-A23.1 with final finishing as follows:
.1 Foundation walls: ensure that all form ties etc. are cut back to minimum 15mm below surface and depressions packed with cement mortar. Remove fins and other projections on exterior face to provide smooth surface for installation of membrane waterproofing, damp proofing, insulation or polyethylene slip sheet, as applicable at exterior and insulation on interior.
.2 Refer to Section 03 35 00 for interior & exterior slab finish.
.2 Rub exposed edges of concrete with Carborundum to produce 3mm radiused edges unless otherwise detailed.

.9 Waterstops.
.1 Install waterstops to provide continuous water seal. Do not distort or pierce water stop in such a way as to hamper performance. Do not displace reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops rigidly in place.
.2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections unless otherwise approved by Consultant.

.10 Joint fillers.
.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.2 Locate and form isolation joints as indicated. Install joint filler.

.3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 CURING

.1 Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete in accordance with CAN/CSA A23.1.

.2 Provide liquid membrane curing compound specified to other concrete surfaces as follows:

.1 Apply specified curing compound to concrete surfaces within one (1) hour of final finishing operations or within one (1) hour of form removal. Apply uniformly in continuous operation by spray or roller in accordance with manufacturer's directions. Maintain continuity of coating and repair damage during curing period.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Owner in accordance with CAN/CSA-A23.1.

.2 Contractor will pay for costs of tests as specified.

.3 Contractor will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.4 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

.5 Inspection or testing by Others will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

3.5 DEFECTIVE CONCRETE

.1 Remove defective concrete and repair as directed by the Consultant.

3.6 SITE TOLERANCE

.1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Materials and installation for copper domestic water service used in the following:
- .1 Copper incoming domestic water service, up to NPS 2 1/2.
- .2 Hard drawn copper domestic hot and cold water services inside building.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
- .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
- .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 ASTM A536 Standard Specification for Ductile Iron Castings.
- .3 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
- .4 AST M - Standard Specification for cross linked Polyethylene (PEX) tubing.
- .5 ASTM F877 Standard specification for cross-linked polyethylene (PEX) plastic hot and cold water distribution systems.
- .6 ASTM F 1960 Standard Specification for cold expansion fittings with PEX reinforcing rings for use with cross-linked polyethylene (PEX) tubing.

.3 American Water Works Association (AWWA).
- .1 AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .2 AWWA 6606 Grooved and Shouldered Joints.

.4 Canadian Standards Association (CSA International).
- .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.
- .2 CSA B137.5 Cross-linked polyethylene (PEX) tubing systems for pressure applications.

.5 Department of Justice Canada (Jus).
- .1 Canadian Environmental Protection Act, (CEPA).

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .1 Material Safety Data Sheets (MSDS).

.7 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
- .1 MSS-SP-67, Butterfly Valves.
- .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
- .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.8 National Research Council (NRC)/Institute for Research in Construction.
- .1 NRCC 38728, National Plumbing Code of Canada (NPC).

.9 Transport Canada (TC).
- .1 Transportation of Dangerous Goods Act, (TDGA).

.10 American National Standards Institute/National Sanitation Foundation (ANSI/NSF).
- .1 ANSI/NSF 61 Drinking Water System Components.
- .2 ANSF/NSF14 Plastic Piping System Components and Related Materials.

1.3 SUBMITTALS

.1 Submittals in accordance with Division 01 - General Requirements.

.2 Submit product data for following: piping, fittings, valves and adhesives.

.1 Provide manufacturers printed product literature and data sheets including product characteristics, performance criteria, physical size, finish and pressure/temperature limitations.

.3 Submit WHMIS MSDS - Material Safety Data Sheets to Consultant for each hazardous material prior to bringing hazardous materials to site.

.4 Provide maintenance data for incorporation into manual specified in Division 01 - General Requirements.

.5 Grooved joint couplings and fittings to be indicated on product submittals and to be specifically identified with the applicable style or series designation.

.6 Cross linked polyethylene (PEX) tubing.

.1 Contractor to provide full layout drawings, details, riser diagrams, calculations including fixture pressure, building pressure critical path, longest run pressure drop, pipe sizing, balancing valves pipe carrying capacity velocities and fixture units. Contractor must also provide installation diagrams, guidelines, hanger spacing, support details, support details thermal expansion contract on details, expansion joints and typical suite/unit details.

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Division 01 - General Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Separate for reuse and recycling 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 CEPA and local or municipal regulations.

.6 Fold up metal banding, flatten and place in designated area for recycling.

1.6 QUALITY ASSURANCE

.1 Cross Linked Polyethylene (PEX) tubing

.1 Qualifications:

.1 Installer Qualifications: Installer shall be experience in performing work of this section and has specialized in installation of work similar to that required for this project.

.2 Installer Qualifications: Installer shall be recognized by the tubing/fitting manufacturer as a "Trained Installer".

.3 Installation Qualifications: Installation must be by skilled tradesmen holding trade qualification license or apprentices under the supervision of a licensed tradesman.

.2 Regulatory Requirements: PEX tubing and components shall be installed in full compliance with all Federal, Provincial and Municipal codes, standards and requirements.

.3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

.2 Press Joint Copper Systems.

.1 Installer shall be a qualified, licensed within the jurisdiction, and factory trained with the installation of copper press joint systems. Certificate of factory training shall be submitted prior to starting work.

.2 Copper press fittings shall be installed using the proper tool, actuator, jaws and rings as instructed by the press fitting manufacturer.
.3 The installation of copper tubing for hot and cold water distribution systems shall conform to the requirements of the National Plumbing Code of Canada.

2 Products

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.
- .1 Above ground:
  - .1 Copper tube, hard drawn, type L: to ASTM B88M.
  - .2 Stainless steel to ASTM A312 / A312M, Schedule 10.
- .2 Buried or embedded:
  - .1 Copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.
  - .2 Cross-linked Polyethylene (PEX), non-air barrier type: to ASTM F 876 and ASTM F 877 with no buried joints.
  - .3 Pipe sleeve shall be provided where piping passes through concrete.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.
.2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.
.3 Cast copper, solder type: to ANSI/ASME B16.18.
.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
.5 NPS 2 and larger: roll grooved to CSA B242. Cast bronze to ANSI/ASME B16.18 or wrought copper to ANSI/ASME B16.22.
- .1 Fittings to be manufactured to copper tube dimensions, flaring of tube or fitting ends to accommodate IPS sized couplings is not permitted.

.6 Stainless steel pipe fittings to ASTM A815 / A185M.
.7 NPS2 and larger roll grooved to CSA-B 242. Cast Stainless Steel to ANSI A-193 Grade B8M, Class 2. Ductile iron mechanical couplings to ASTM A536. All couplings to and groove systems shall be designed specifically for stainless steel pipe meeting the requirements of NSF-61.
.8 PEX fittings to ASTM F 877, ASTM F 1807 and/or ASTM F 1960, as appropriate.
.9 NPS 1 1/2 and under: Cast copper, ANSI/ASME B16.12 of wrought copper, ANSI/ASME B16.22 with stainless steel internal components, EPDM seal and push to comment or press fit joints for hand drawn copper tube type L or type K rated for 1300 KPA at ASTM B88
.10 NPS 1½ and under: Cast copper, ANSI/ASME B16.18 or wrought copper, ANSI/ASME B16.22; with 301 stainless steel internal components. EPDM seal and push to connect or press fit joints, hand drawn copper tube type L or K rated for 1300 kPA at ASTM B88.

2.3 JOINTS

.1 Rubber gaskets, latex free, 1.6 mm thick: to AWWA C111.
.2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
.3 Solder: 95/5 tin copper alloy lead free.
.4 Teflon tape: for threaded joints.
.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM flush seal gasket. Gasket to be classified in accordance with ANSI/NSF 61 for potable water service. Couplings to be manufactured to copper tube dimensions. Flaring of tube or fitting ends to accommodate IPS sized couplings is not permitted.
.6 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.
.7 Push to connect: EPDM gasket, UL classified in accordance with ANSI/NSF 61 for potable water service.

2.4 GATE VALVES

.1 NPS 2 and under, soldered:
- .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 22 - Valves - Bronze

.2 NPS 2 and under, screwed:
- .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 22 - Valves - Bronze

.3 NPS 2-1/2 and over, in mechanical rooms, flanged:
- .1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim specified Section 23 05 23 - Valves - Cast Iron

.4 NPS 2-1/2 and over, other than mechanical rooms, flanged:
- .1 Non-rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, bronze trim, bolted bonnet specified Section 23 05 23 - Valves - Cast Iron.

2.5 GLOBE VALVES

.1 NPS2 and under, soldered:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 22 - Valves - Bronze
- .2 Lockshield handles: as indicated.

.2 NPS 2 and under, screwed:
- .1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc as specified Section 23 05 22 - Valves - Bronze
- .2 Lockshield handles: as indicated.

2.6 SWING CHECK VALVES

.1 NPS 2 and under, soldered:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 22 - Valves - Bronze.

.2 NPS 2 and under, screwed:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 22 - Valves - Bronze.

.3 NPS 2-1/2 and over, flanged:
- .1 To MSS-SP-71, Class 125, 860 kPa, cast iron body, flat flange faces, regrind seat, bronze disc, bolted cap specified Section 23 05 23 - Valves - Cast Iron: Gate, Globe, Check.

2.7 BALL VALVES

.1 NPS 2 and under, screwed:
- .1 Class 150.
- .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 22 - Valves - Bronze.

.2 NPS 2 and under, soldered:
- .1 To ANSI/ASME B16.18, Class 150.
- .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors as specified Section 23 05 22 - Valves - Bronze.

2.8 BUTTERFLY VALVES

.1 NPS 2-1/2 and over, wafer or lug:
- .1 To MSS-SP-67, Class 200.
- .2 As specified in Section 23 05 26 - Butterfly Valves.

.2 NPS 2-1/2 and over, grooved ends:

.1 Class 300, as specified in Section 23 05 26 - Butterfly Valves
.2 Grade CF8M stainless steel body, disk and stem. PTFE impregnated glass fabric bearings with stainless steel backing and and synthetic rubber seal. Valve stem shall be offset from disc centerline to provide full 360 degree circumferential seating. Bubbletight, dead-end or bi-directional service to 300 PSI CWP.

3 Execution

3.1 INSTALLATION

.1 Install in accordance with NPC and local authority having jurisdiction.
.2 Install pipe work in accordance with Section 23 05 05 Installation of Pipework.
.3 Assemble piping using fittings manufactured to ANSI standards.
.4 Grooved joint couplings and fittings to be installed in accordance with the manufacturer's written installation instructions. Grooved ends to be clean and free from indentations, projections and roll marks in the area from pipe end to groove. Gaskets to be verified as suitable for the intended service prior to installation. Gaskets to be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative to provide on-site training for Contractor's field personnel in the use of grooving tools, application of groove and installation of groove, and installation of grooved joint products. The manufacturer's representative to periodically visit the jobsite and review installation. Contractor to move and replace any joints deemed improperly installed.
.5 Push-to Connect and Press Fit Piping: Prepare copper tube and install in strict accordance with installation instructions. Pipe ends to be cleaned, free from indentations, projections, burrs, and foreign matter. Use a tube preparation tool to clean and make installation mark. Push copper tube into fittings to installation depth mark, per installation instructions. Keep fittings free of dirt and oil.
.6 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
.7 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
.8 Install pipe work in accordance with Section 23 05 05 -Installation of Pipework and by certified Journey Person supplemented as specified herein.
.9 Grooved joint couplings and fittings to be installed in accordance with the manufacturer's written installation instructions. Groove ends to be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets to be verified as suitable for the intended service prior to installation. Gaskets to be moulded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative to provide on site training for contractor's field personnel in the use of grooved tools, application of groove and installation of grooved joint products. The manufacturer's representative to periodically visit the job site and review installation. Contractor to remove and replace any joints deemed improperly installed.
.10 Push to connect piping: Prepare copper tube and install in strict accordance with installation instructions. Pipe ends to be cleaned, free from indentations, projections, burns, and foreign matter. Use tube preparation tool to clean and make installation mark. Push copper tube into fittings to installation depth mark, per installation instructions. Keep fittings free of dirt and oil.
.11 Buried Tubing:
  .1 Lay in well completed washed sand in accordance with AWWA Class B bedding.
  .2 Bed tubing without crimping or constriction. Minimized us of fittings.

3.2 VALVES

.1 Isolate equipment, fixtures and branches with butterfly or ball valves.
.2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

.1 Conform to requirements of Section 21 05 01 - Common Work Results - Mechanical
.2 Test pressure: greater of 1-½ times maximum system operating pressure or 860 kPa.

3.4 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory bacterialogical and chemical testing to verify that system is clean to provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.5 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.
.2 Verify that system can be completely drained.
.3 Ensure that pressure booster systems are operating properly.
.4 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction and approval of Consultant.
.2 Upon completion, provide laboratory test reports on water quality for Consultant approval.

3.7 START-UP

.1 Timing: Start up after:
  .1 Pressure tests have been completed.
  .2 Disinfection procedures have been completed.
  .3 Water treatment systems operational.
.2 Provide continuous supervision during start-up.
.3 Start-up procedures:
  .1 Establish circulation and ensure that air is eliminated.
  .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
  .3 Bring HWS storage tank up to design temperature slowly.
  .4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
  .5 Check control, limit, safety devices for normal and safe operation.
.4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

.1 Timing:
  .1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.
.2 Procedures:
  .1 Verify that flow rate and pressure meet Design Criteria.
  .2 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
  .3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
  .4 Sterilize HWS and HWC systems for Legionella control.
  .5 Verify performance of temperature controls.
  .6 Verify compliance with safety and health requirements.

.7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.

.3 Reports:

.1 In accordance with Section 01 91 13 - General Commissioning Requirements, as specified.

.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

.3 Chemical and biological water testing report.

.4 Pressure testing report signed off by Contractor and witness for each section of piping tested.

.5 Flushing and cleaning report signed off by Contractor and witness for each section of piping.

END OF SECTION

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1 General

1.1 SUMMARY

.1 Section Includes:
- .1 Materials and installation for light fuel oil piping from oil tanks to boilers or engines.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)
- .1 ASME-B16.3-, Malleable-Iron Threaded Fittings.
- .2 ASME-B16.9-, Factory-Made Wrought Steel Buttwelding Fittings.

.2 American Society for Testing and Materials International (ASTM)
- .1 ASTM A47/A47M-, Standard Specification for Ferritic Malleable Iron Castings.
- .2 ASTM A53/A53M-, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
- .3 ASTM B61-, Standard Specification for Steam or Valve Bronze Castings.
- .4 ASTM B75M-, Standard Specification for Seamless Copper Tube.

.3 Canadian Standards Association (CSA International)
- .1 CSA-B139-, Installation Code for Oil Burning Equipment.
- .2 CSA-B140.0-, Oil Burning Equipment: General Requirements.

.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.5 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)
- .1 MSS-SP-80-, Bronze Gate, Globe, Angle and Check Valves.

1.3 SUBMITTALS

.1 Submittals in accordance with Division 01 - General Requirements.

.2 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
  - .1 Indicate on manufacturer's catalogue literature the following: valves.

.3 Submit WHMIS MSDS in accordance with Section . Indicate VOC's for adhesive and solvents during application and curing as required.

.4 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Instructions: submit manufacturer's installation instructions.

.7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Division 01 - General Requirements.

1.4 QUALITY ASSURANCE

.1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Division 01 - General Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:
- .1 Separate waste materials for reuse in accordance with Division 01 - General Requirements.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
.4 Separate for reuse and place in designated containers Steel waste in accordance with Waste Management Plan (WMP).
.5 Place materials defined as hazardous or toxic in designated containers.
.6 Handle and dispose of hazardous materials in accordance with CEPA, regulations.
.7 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.
.8 Unused paint materials must be disposed of at official hazardous material collections site as approved by Consultant.
.9 Unused sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

2 Products

2.1 FILL VENT AND CARRIER PIPE

.1 Steel: to ASTM A53/A53M, Schedule 40, continuous weld or electric resistance welded, screwed. Per CSA B139.
.2 Copper: type L, soft copper tubing, to ASTM B75M, in continuous lengths. Per CSA B139.

2.2 STEEL PIPE COATING

.1 Bituminous (Bitumen) Asphalt Coating: in accordance with manufacturer's recommendations for exterior above ground or galvanized.
.2 Acceptable material: Benjamin Moore Corotech Cold Tar Epoxy V157, Sherwin William Tar Guard Cold Tar Epoxy B69B60 / B69 V60.

2.3 JOINTING MATERIAL

.1 Screwed fittings: teflon tape or pulverized lead paste.
.2 Soldered fittings: 95/5.

2.4 FITTINGS

.1 Steel:
  .1 Malleable iron: screwed, banded, Class 150 to ASME-B16.3.
  .2 Welding: butt-welding to ASME-B16.9.
  .3 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A47/A47M.
  .4 Nipples: Schedule 40, to ASTM A53/A53M.
  .5 Flexible Connections: 1A braided kink-proof flexible connection with woven jacket and oil proof synthetic tube and cover and neoprene liner, shall be used. Supporting wire shall be run the full length of hose. Hose to pipe connectors are to be of the removable metal compression type. Temperature range shall be -40C to 121C.
.2 Copper:
  .1 Piping: soldered type.
  .2 Connections to equipment: compression.

2.5 GATE VALVES

.1 NPS 2 and under, screwed bonnet:
  .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, solid wedge disc as specified under Section 23 05 22 - Valves - Bronze.

2.6 GLOBE VALVES

.1 NPS 2 and under, screwed:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, screwed over bonnet, renewable bronze disc as specified under Section 23 05 22 - Valves - Bronze.
.2 Lock shield handles: as indicated.

2.7 BALL VALVES

.1 NPS 2 and under:
.1 Bronze body, screwed ends, TFE seal, hard chrome ball, 4 MPa, WOG as specified under Section 23 05 22 - Valves - Bronze.

2.8 SWING CHECK VALVES

.1 NPS 2 and under, screwed:
.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc suitable for oil service, screw in cap, regrindable seat as specified under Section 23 05 22 - Valves - Bronze.

2.9 LUBRICATED PLUG COCKS

.1 NPS 2 and under, screwed:
.1 To ASTM B61, Class 150, 1 MPa, bronze body.

2.10 OIL FILTER

.1 Duplex type replaceable cartridge type as recommended by oil burner manufacturer.
.2 Furnish spare filter cartridge.

2.11 ANTI-SIPHON VALVE

.1 Electric solenoid type anti-siphon valve on each fuel oil suction line. Install at the highest point in suction line.
.2 Voltage to match burner requirements.
.3 Provide wiring installed in EMT conduit as required to interlock with burner.
.4 Acceptable material (CSA Certified meeting requirements of Authority Having Jurisdiction):
.1 Morrison Bros 710.

2.12 FUSIBLE VALVE

.1 Normally open, Emergency Shut off valve ULC/ORD-C842 listed, 165 °F fusible link activates spring closure, 316 SST or brass body. Standard of Acceptance: Model 446, Morrison Bros. Emergency Shut off valve.

2.13 OIL DEAERATOR

.1 Combination oil deaerator / filter assembly.
.2 Acceptable material: Tiger Loop TWIN S220.15

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 datasheet.

3.2 PIPING

.1 Install piping in accordance with Section 23 05 01 - Installation of Pipework, supplemented as specified.
.2 Install oil piping system in accordance with CSA-B139 and CSA-B140.0.
.3 Slope piping down in direction of storage tank unless otherwise indicated.
.4 Suction and return piping inside building:

.1 Steel with screwed fittings in trench below floor or pan on floor, protected by 6mm checkered aluminum plate cover in traffic areas.
.2 Install filter and gate valve and fusible valve at burners.
.3 Where suction line enters building, install union, gate valve, anti-syphon device, fusible valve and cap (for priming purposes).

.5 Fill, vent, suction and return outside building:
.1 Steel piping welded throughout except at tanks where use electrically isolating fittings.
.2 Grading: slope piping at 1% minimum back to tanks.

.6 Install suction and return buried piping in outer casings in accordance with provincial regulations.

.7 Piping at tanks:
.1 Suction: terminate 150 mm from bottom of tank with foot valve.
.2 Return: terminate 100 mm from bottom of tank with return bend.
.3 Vent: extend into tank and terminate less than 25 mm from top. Terminate open end 3600 mm above grade with return bend vent alarm and removable 10 mesh copper screen.
.4 Fill: terminate as indicated with liquid-tight and vapour cover, locking cap, chain and padlock.
.5 Dipstick: extend tube to within 150 mm from bottom of tank. Terminate at grade with cap and chain and watertight cover.

.8 Interconnections between tanks:
.1 Interconnect fill, vent, suction, return to ensure equal level in tanks.
.2 Valve to permit isolation of tanks without interfering with use of other tanks.

3.3 VALVES

.1 Install valves with stems upright or horizontal unless approved otherwise by Consultant.
.2 Install ball valves at branch take-offs, to isolate pieces of equipment and as indicated.
.3 Install globe valves for balancing and in by-pass around control valves.
.4 Install swing check valves on discharge of pumps and as indicated.

3.4 OIL FILTERS

.1 Install at pumps and at burners / engines.
.2 At time of acceptance, replace filter cartridge with new.

3.5 FIELD QUALITY CONTROL

.1 Site Tests/Inspection:
.1 Test system in accordance with CSA-B139 and CSA-B140.0 and authorities having jurisdiction.
.2 Isolate tanks from piping pressure tests.
.3 Maintain test pressure during backfilling.

.2 Manufacturer's Field Services:
.1 Have manufacturer of products, supplied under this Section, review work involved in the handling, installation / application, protection and cleaning of its products and submit written reports, in acceptable format to verify compliance of work with Contract.
.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
.3 Schedule site visits to review work, at stages listed:
.1 After delivery and storage of products, and when preparatory Work or other Work, on which the work of this Section depends is complete, but before installation begins.
.2 Twice during process of work at 25% and 60% complete.

.3 Upon completion of the work, after cleaning is carried out.

.4 Obtain reports within three (3) working days of review and submit immediately to the Owner's Representative.

3.6 CLEANING

.1 In accordance with Section 23 08 02 - Cleaning and Start-Up of Mechanical Piping Systems, supplemented as specified herein.

.2 Flush after pressure test with number 2 fuel oil for a minimum of two hours. Clean strainers and filters.

.3 Dispose of fuel oil used for flushing out in accordance with requirements of authority having jurisdiction.

.4 Check vents from regulators, control valves are terminated in approved location and are protected against blockage and damage.

.5 Check entire installation is approved by authority having jurisdiction.

.6 Perform cleaning operations in accordance with manufacturer's recommendations.

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

END OF SECTION

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1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
  .1 CSA C22.2 No.46-M1988, Electric Air-Heaters.

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit product data sheets for unit heaters. Include:
  .1 Product characteristics.
  .2 Performance criteria.
  .3 Mounting methods.
  .4 Physical size.
  .5 kW rating, voltage, phase.
  .6 Cabinet material thicknesses.
  .7 Limitations.
  .8 Colour and finish.
.3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.3 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for unit heaters for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management and with Waste Reduction Workplan.
.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
.3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

2 Products

2.1 MANUFACTURERS

.1 Acceptable material:
  .1 Ouellet.
  .2 Dimplex.
  .3 Chromalox.
  .4 Stelpro.

2.2 UNIT HEATERS

.1 Unit heater: to CSA C22.2 No.46, horizontal discharge complete with adjustable louvers finished to match cabinet, or vertical discharge cone type with cone diffuser as indicated.
.2 Fan type unit heaters with built-in high-heat limit protection, fan-delay switches.
.3 Fan motor: totally enclosed, permanently lubricated ball bearings type with resilient mount.
  .1 Built-in fan motor thermal overload protection.
.4 Hangers: as indicated.
.5 Elements: mineral insulated steel sheath with aluminum, continuous helical brazed fins.
.6 Cabinet: steel, 1.6 mm thick, fitted with brackets for rod or wall mounting.
  .1 Phosphatized and finished with 2 coats baked enamel.

2.3 CONTROLS

.1 Wall mounted thermostats: type line, low voltage or electronic and solid state relays, Energy Star certified, to Section 23 09 33 - Electric and Electronic Control System for HVAC or Section 25 30 02 EMCS: Field Control Devices.

.2 Built in or wall mounted thermostat and support controls.

3 Execution

3.1 INSTALLATION

.1 Suspend unit heaters from ceiling or mount on wall as indicated. Provide mounting bracket as required.

.2 Install thermostats in locations indicated.

.3 Make power and control connections.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Test cut-out protection when air movement is obstructed.

.3 Test fan delay switch to assure dissipation of heat after element shut down.

.4 Test unit cut-off when fan motor overload protection has operated.

.5 Ensure heaters and controls operate correctly.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA)
- .1 CSA C22.1-21, 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, control panels, accessories, piping, ductwork, 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 Provide single line electrical diagrams in glazed frames or laminated sheets as follows:
.1 Electrical distribution system: locate in main electrical room.
.2 Electrical power generation and distribution systems: locate in power plant rooms.

.4 Submit WHMIS MSDS information in accordance with Division 01 - General Requirements.

.5 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 doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of an electrician.

.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 newly installed or existing modified electrical systems and instrumentation.
.3 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 with new and existing systems and services and maximum usable space.

.3 Contractor to locate 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 head room and 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 fixtures and outlets. The Drawings do not show Architectural, Mechanical or Structural 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 CUTTING AND PATCHING

.1 Electrical Contractor to inform all other divisions in time, of required electrical openings and/or penetrations. Where this requirement is not met, the cost of all cutting and associated work to provide openings and/or penetrations will be the responsibility of the Electrical Contractor. Obtain written approval of Structural Engineer before drilling through any beams or floors. Keep hole sizes to a minimum and be responsible to repair damage caused by lack of coordination.

1.11 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.

1.12 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.

1.13 SCHEDULING OF WORK

.1 Work is to be scheduled as described in Division 01 - General Requirements.

.2 Become familiar with the phasing requirements for the work and comply with these conditions.

.3 No additional monies will be paid for Contractor's requirement to comply with work scheduling conditions.

.4 Note that the Owner intends to carry on business as usual throughout the site and work activities must be coordinated to minimize disruption and maintain electrical services in occupied areas. Provide any required temporary work.

.5 Work activities which disrupt occupants of the building, such as excessive noise caused by drilling of walls, floors or ceilings must be approved and scheduled in writing by the Project Manager at least 72 hours in advance.

.6 All power shutdowns which affect building occupants or building operation must have prior approval of Owner and must be scheduled in writing at least 72 hours in advance with the Project Manager.

.7 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.

1.14 FIRE RATING OF PENETRATIONS

.1 Provide fire stopping and smoke seal materials at openings around cabling conduits passing through floors, ceilings and fire rated walls, as required to maintain fire rating equal to the fire rated assembly.

.2 Use ULC or approved equal fire barrier products installed in accordance with manufacturers instructions at each penetration.

.3 Acceptable material for fire barrier products to be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.

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 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.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

.1 All junction and pull boxes, new or existing that has been modified, are to be marked with an indelible ink marker to designate the circuit number of enclosed wiring, the designated panel name and electrical characteristics. Where boxes are painted in exposed areas, information is to be written on inside of box cover.

.2 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	12 x 70 mm	1 line	8 mm high letters
Size 5	12 x 70 mm	2 lines	5mm high letters
Size 6	12 x 70 mm	1 line	12mm high letters
Size 7	12 x 70 mm	2 line	6 mm high letters

.3 Labels:
.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
.4 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
.5 Allow for average of twenty-five (25) letters per nameplate and label.
.6 Identification to be English.
.7 Nameplates for pull boxes and junction boxes to indicate system name and voltage characteristics.
.8 Nameplates for disconnects, starters and contactors to indicate equipment being controlled, wire, voltage, phase, number of power source and branch circuit breaker number.
.9 Lamicoid nameplates installed on combination starters, magnetic starters, manual starters and all various system controls, control panels, contactors, disconnect switches, and large junction and pull boxes shall contain the following information:
.1 Designated name of equipment.
.2 Designated name of power source.
.3 Voltage, number of phases and wires.
.4 Branch circuit breaker number(s) where possible.
.5 The following is an example:

FUEL MONITORING SYSTEM 120V-1PH; FED FROM PANEL 'A-42'

.10 Install an additional nameplate on all, or any piece of electrical equipment, or apparatus, i.e. Main Switchboard, CDP panels, panelboards, motor control centres, and fusible switches, etc., that may contain overcurrent devices, i.e. circuit breakers and/or fuses, that have been designed for, and incorporate an interrupting capacity sized "larger" than 10 KAIC.

Example:

Minimum interrupting capacity of breakers installed in this panel is to be not less than 22 KAIC	Minimum interrupting capacity of fuses installed in this switch are to be not less than 100 KAIC

2.6 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 C22.1-21, Canadian Electrical Code.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.
  .1 Colour coding of electrical boxes and their associated covers located in finished areas to be applied to the inside cover and box.
.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.
  .1 Colours indicated below are for reference only. If an existing colour coding scheme exists within the building, then the existing colour coding scheme is to be utilized.

SYSTEM	PRIME COLOR	AUXILIARY COLOR
600V (normal)	Yellow	White
208/120V (normal)	Yellow	-------
208/120V (essential)	Yellow	Blue
Telephone	White	-------
Data	Green	-------
Fire Alarm	Red	-------
Access Control	Gray	-------
CCTV	Purple	Black
Low Voltage Lighting	Black	-------

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 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
.3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.
.4 Prior to rough-in, coordinate locations of conduit runs with other trades.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless indicated otherwise.
.2 If mounting height of equipment is not specified or indicated, verify with Consultant before proceeding with installation.
.3 Install electrical equipment at the following heights:
  .1 Local switches: 1200 mm.
  .2 Wall receptacles:
    .1 General: 450 mm.
    .2 Above top of continuous baseboard heater: 200 mm.
    .3 In mechanical rooms: 1400 mm.

.3 Panelboards: 1600 mm or as required by Code.
.4 Telephone and data outlets: 450 mm.
.1 Above top of continuous baseboard heater: 200 mm.
.5 CCTV cameras: As indicated on the Drawings.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.6 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 Conduct and pay for following tests in accordance with Division 01 - General Requirements.
.1 Power distribution system including phasing, voltage and grounding.
.2 Branch circuits, both new and existing modified, originating from branch distribution panels.
.3 Lighting and its control.
.4 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.
.5 Systems:modified CCTV & Fuel Monitoring Station.
.6 Ground system continuity and resistance test.
.4 Furnish manufacturer’s certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer’s instructions.
.5 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

3.7 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.
.3 Clean luminaire lenses, housings, louvers, etc. upon completion of construction.

END OF SECTION

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1 General

1.1 DESCRIPTION OF WORK

.1 Work of this Section consists of the complete removal of all obsolete or abandoned electrical equipment, as well as modifications to existing electrical systems, including, but not limited to:
  .1 Removal of existing obsolete lighting, conduit and wire, and raceway.
  .2 Removal of existing obsolete power and communication system conduit and wire/cabling.
  .3 Electrical and systems related to relocation of existing fuel monitoring system.

.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 structures 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 Where indicated remove all obsolete or abandoned equipment or electrical services including wire and conduit back to the source.

.2 Coordinate work of this Section with other trades.

.3 Schedule all removal work with the Owner. Do not disrupt building operations except as permitted by the Schedule.

.4 Any existing conduit, wiring, boxes or equipment that is to remain in service is to be properly supported as required by the Canadian Electrical Code. Any additional hangers, straps or fasteners required are to be supplied under this contract.

.5 Make alterations to existing electrical services as required and make good all circuits affected by the renovations.

.6 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.

.7 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 All circuits in existing panelboards serving renovated areas are to be traced out to identify any devices not labeled on existing directories and to confirm all circuits indicated on directories are accurate. Provide new, updated, typewritten circuit directories in all panelboards modified by the renovations.

.2 Provide identification indicating circuit and panel number at all new and existing wiring devices in renovated area.

.3 Provide equipment nameplates and labels for all new and existing equipment in renovated area.

.4 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 CUTTING

.1 Cutting required for removals and alterations to be to the approval of the Consultant and performed with appropriate power tools.

3.4 CLEANING

.1 Reused existing equipment to be cleaned 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 Crimp style wire connectors, nylon insulated, with current carrying parts of copper alloy for conductors #16 AWG and smaller.
.2 Fork tongue or ring style connectors, nylon insulated crimp style. Terminals for connecting conductors #16 AWG and smaller to screw down terminals.
.3 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.
.4 Fixture type twist-on splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors #10 AWG or less.
.5 Compression type connectors for connecting #6 AWG conductors and larger, unless indicated otherwise.
.6 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.
.7 Clamps or connectors for armoured cable, aluminum sheathed cable, Teck cable, flexible conduit, non-metallic sheathed 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 36 - Cable Trays for Electrical Systems.
.5 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.
.6 Section 26 50 00 - Lighting.

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.
  .3 CSA C22.2 No. 174, Cables and Cable Glands for use in Hazardous Locations.

2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for #8 AWG and larger, solid for #10 AWG and smaller.
.2 Minimum size to be #12 AWG for lighting and power, #14 AWG for controls, #16 AWG for low voltage and lighting relay/controls.
.3 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 related to new service entrance feeders and site lighting circuits. RWU90 XLPE not required under interior floor slabs.
.4 Single conductor metal sheathed cables are not permitted.
.5 Conductor sizes on drawings are based on copper conductors.
.6 Aluminum Composite Material (ACM) conductors will not be permitted as an acceptable alternative to copper conductors.

2.2 TECK CABLE

.1 Cable: to CAN/CSA C22.2 No. 131.
.2 Conductors:
  .1 Grounding conductor: copper.
  .2 Circuit conductors: copper and ACM alloy, size as indicated.
.3 Insulation:
  .1 Chemically cross-linked polyethylene (XLPE), rated RW90, 600 V.
.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.
  .3 Threaded rods: 6 mm dia. to support suspended channels.
.8 Connectors:
  .1 Watertight spin-on style connectors or type approved for TECK cable.
    .1 Acceptable material:
      .1 Thomas & Betts - Star Teck.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.
.2 Type: AC90.
.3 Armour: interlocking type fabricated from aluminum strip.
.4 Connectors: standard as required, complete with double split rings in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

2.4 CONTROL CABLES

.1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket.
.2 Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40°C polyethylene insulation with shielding of tape coated with paramagnetic material wire braid over each conductor and overall covering of PVC jacket.

2.5 NON-METALLIC SHEATHED CABLE

.1 Not applicable.

3 Execution

3.1 WIRING METHODS

.1 All work to be concealed in finished areas where possible, wire in black painted conduit where exposed in finished areas.
.2 All work in or through fire rated or acoustic structures to be in accordance with Section 26 05 00 - Common Work Results - Electrical.
.3 Panelboard feeders: building wire in conduit.
.4 Branch circuit work:
  .1 Concealed work in wall partitions: building wire in conduit or armoured cable.
  .2 Horizontal work above accessible ceilings: building wire in conduit or armoured cable.
  .3 Surface work in unfinished areas: building wire in conduit.
  .4 Armoured cable may be used where permitted by the Canadian Electrical Code for drops to new equipment in existing gypsum board walls and ceilings.
.5 Drops to light fixtures to be building wire in flexible conduit or armoured cable, maximum length 1.5 m.
.6 Branch circuit wiring to be sized for a maximum voltage drop of 3% and no greater than 5% across the entire circuit length from service to point of utilization.

3.2 GENERAL CABLE INSTALLATION

.1 Support cables in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.
.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0-1000 V).
.3 Cable Colour Coding: to Section 26 05 00 - Common Work Results - Electrical.
.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.
.6 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
.7 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
.8 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:
  .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
  .2 In trenches and underground ducts in accordance with Section 26 05 43.01 - Installation of Cables in Trenches and Ducts.

3.4 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).

3.5 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.
.2 Use permitted only for work in movable partitions and vertical power supply drops to lighting fixtures.
.3 Install anti-shorts as required.
.4 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.6 INSTALLATION OF CONTROL CABLES

.1 Controls wiring for mechanical systems to be completed by the Controls Contractor. All other controls wiring to be completed by the Electrical Contractor.
.2 Install control cables in conduit as indicated.
.3 Ground control cable shield.
.4 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.7 RESTRICTIONS

.1 Splices in wire and cable #6 AWG and larger are not permitted.
.2 Flexible conduit or armoured cable drops to luminaires are to be installed from junction box to luminaires, loops between luminaires is not permitted.
.3 Wiring and cabling, both concealed and exposed, is to be installed parallel and/or perpendicular to building lines in a clean, organized and professional fashion. Where possible, wiring and cabling is to follow a common pathway.

3.8 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

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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 Plate electrodes: copper, surface area 0.2 m2, 1.6 mm thick.
.3 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
.4 Insulated grounding conductors: green, type RW90, copper, size as indicated.
.5 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.
.6 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 Thermit welded type conductor connectors, will not be permitted.
  .5 Bonding jumpers, straps.
  .6 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 connection.
.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. Where EMT is used, run insulated copper bond wire in conduit.
.8 Install internal bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.
.9 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
.10 Install separate ground conductor to outdoor lighting standards.
.11 Connect building structural steel and metal siding to ground by welding copper to steel.
.12 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
.13 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

3.2 ELECTRODES

.1 Install concrete encased electrodes in building foundation footings, with terminal connected to grounding network.
.2 Install rod, plate electrodes and make grounding connections.
.3 Bond separate, multiple electrodes together.
.4 Use size 2/0 AWG copper conductors for connections to electrodes as required by Section 10 of the Canadian Electrical Code.
.5 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 600 V system, secondary 208 V system.

3.4 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 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended or set in poured concrete walls and ceilings as required.

2.2 SPECIFIC PURPOSE SUPPORTS

.1 Specific purpose heat treated, spring steel fasteners to support boxes, conduit and cable from main structure, channels, and metal studs.

3 Execution

3.1 INSTALLATION

.1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
.2 Secure equipment to poured concrete with expandable inserts.
.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
.4 Secure surface mounted equipment with bar type box hangers. Ensure that box hangers are adequately supported to carry weight of equipment specified before installation.
.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
.6 Fasten exposed conduit or cables to building 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 Beam clamps to secure conduit to exposed steel work.
  .4 Strap AC90 at box location and at every 900 mm.
.7 Suspended support systems.
  .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
  .2 Support two (2) or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
.8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
.11 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
.12 Electrical boxes concealed in hollow gypsum board walls to be supported by specific purpose brackets or clips designed for stud wall construction.
.13 Boxes installed in steel stud walls to be mounted on screw gun brackets installed between studs.

3.2 RESTRICTIONS

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

.2 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Consultant.

.3 Do not install cable, raceway, or boxes directly to underside of roof deck, maintain a minimum separation of 1.5" as required by Code.

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 C22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

2 Products

2.1 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.
.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.
.3 Covers with turned edges for surface-mounted pull and junction boxes.
.4 Junction and pull boxes and associated joints and fittings located in hazardous locations are to be cast explosion proof with threaded connections to conduit and cable glands.
.5 Splicing of access control cable harness to be completed with DIN rail mounted terminal blocks in junction boxes. Marrettes will not be accepted.
.6 Acceptable material:
  .1 Appleton GRUE Series boxes c/w sealing cover where required.

3 Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous, but accessible locations.
.2 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.2 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.
.2 Install size 2 identification labels indicating system name voltage and phase or box designation as indicated.

END OF SECTION

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1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.
.2 Section 26 05 29 – Hangers and Supports for Electrical Systems.
.3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)
  .1 CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.
  .2 CSA C22.2 No. 30-M1986 (R2012) Explosion Proof Enclosures for use in Class 1 Hazardous Locations.
  .3 CSA 22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA 22.1-21.
.2 102 mm square or larger outlet boxes as required.
.3 Gang boxes where wiring devices are grouped.
.4 Blank cover plates for boxes without wiring devices.
.5 Combination boxes with steel barriers where outlets for more than one system or voltage are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
  .1 Screw-on, turned edge covers for surface mounted boxes.
.3 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.
.4 102 mm square or octagonal outlet boxes for luminaires.

2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.
.2 Cast explosion proof boxes, joints and fittings c/w threaded connections to conduit and cable glands to be used in hazardous locations in accordance with CSA 22.2 No. 30.
  .1 Acceptable material:
    .1 Appleton GRUE Series Boxes c/w sealing cover where required.

2.5 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.
.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
.4 Double locknuts and insulated bushings on sheet metal boxes.
.5 Double split rings for AC90 terminations.

3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.
.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
.3 For flush installations mount outlets flush within finished walls using plaster rings to permit wall finish to come within 6 mm of opening.
.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
.5 Vacuum clean interior of outlet boxes before installation of wiring devices.
.6 Identify systems for outlet boxes in accordance with Section 26 05 00 - Common Work Results - Electrical.
.7 Outlet boxes and conduit boxes to be flush mounted in new construction. Outlet and conduit boxes in existing construction to be flush mounted except in existing masonry filled block walls.
.8 Install vapour barrier boxes around all device boxes installed in acoustical wall types and structures. Fill void between device box and vapour barrier with isolating expansion foam where indicated.
.9 Install vapour barrier boxes around all galvanized steel device boxes recess mounted in exterior walls and structures.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA)
- .1 CSA C22.2 No. 45, Rigid Metal Conduit.
- .2 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .3 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
- .4 CSA C22.2 No. 211.2 (R2011), Rigid PVC (Unplasticized) Conduit.
- .5 CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.
- .6 CSA C22.2 No. 18.3-12, Conduit, Tubing, and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 & UL 514B).
- .7 CSA C22.2 No. 30-M1986 (R2012) Explosion Proof Enclosures for use in Class 1 Hazardous Locations.
- .8 CSA 22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

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 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with steel set-screw couplings and connectors.
- .1 Exposed conduit in finished areas to be painted to match adjacent finished surfaces where indicated.

.4 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, aluminum flexible metal.

.6 FRE conduit: to CSA C22.2.

.7 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 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits spaced every 1.5 m on center.

.4 Threaded rods, 6 mm dia., to support suspended channels.

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 CONDUIT SEALS

.1 Conduit seals are to be provided where conduit systems enter an explosion proof or flame proof enclosure in accordance with CSA 22.1-21 Section 18, and CSA C22.2 No.30.
.2 Conduit seals are to be installed no further than 450 mm from the explosion proof or fireproof enclosure.
.3 Threaded joints that are required to be explosion proof or flame proof are permitted to be either tapered or straight threaded provided the engaged thread count required by CSA C22.2 No. 30.
.4 Only approved explosion proof or flame proof adaptors, unions, couplings, reducers and elbows that are not larger than the trade size of conduit will be permitted between the sealing fitting and the explosion proof or flame proof enclosure.
.5 Explosion proof EYS for vertical conduit or ESUF with rotatable pour spout for horizontal conduit to be listed for Class 1, Zone 1 Hazardous Locations and manufactured with malleable iron construction and corrosion resistant epoxy powder coat finish. Sealing to be completed in accordance with manufacturers instructions and with sealant and fibre dams listed by an approved certification agency for use with the fitting.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

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

2.6 FISH CORD

.1 Polypropylene.

2.7 SEALANT

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

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 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
.3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
.4 Surface mount conduits except in finished areas or as indicated.
.5 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.

.6 Use epoxy coated conduit underground in corrosive areas and where exposed to exterior elements. (ie: pole mounted service entrance conduits)
.7 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.
.8 Use rigid PVC conduit underground and buried in or under concrete slab on grade.
.9 Use FRE conduit for encasement in concrete duct bank for service entrance feeders.
.10 Use flexible metal conduit for connection to motors in dry areas, connection to recessed luminaires without a prewired outlet box, and for connection to surface or recessed luminaires work in movable metal partitions.
.11 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
.12 Use AC-90 for vertical power supply drops to luminaires.
.13 Use explosion proof flexible connection for connection to explosion proof equipment.
.14 Install conduit sealing fittings in hazardous areas. Fill with compound.
.15 Minimum conduit size for lighting and power circuits: 21 mm. 16 mm conduit is acceptable for switch leg drops and control circuits only.
.16 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
.17 Mechanically bend steel conduit over 21 mm dia.
.18 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
.19 Install fish cord in empty conduits.
.20 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
.21 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.
.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
.3 Run conduits in flanged portion of structural steel.
.4 Group conduits wherever possible on suspended channels.
.5 Do not pass conduits through structural members except as indicated.
.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.
.2 Do not install horizontal runs in masonry walls.
.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one third of slab. Use rigid PVC conduit.
.2 Tie off conduit to adjacent reinforcing rebar to mitigate conduit movement during concrete pour.
.3 Protect conduits from damage where they stub out of concrete. Use rigid steel conduit for stub-up and adapt to in floor rigid PVC conduit.
.4 Install sleeves where conduits pass through slab or wall.
.5 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.
.6 Do not place conduits in slabs in which slab thickness is less than 4 times conduit diameter.
.7 Encase conduits completely in concrete with minimum 25 mm concrete cover.
.8 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Run conduits 25 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

3.7 CONDUITS UNDERGROUND

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

3.8 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.

2 Products

2.1 CABLE PROTECTION

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

2.2 MARKERS

.1 Concrete type cable markers: 600 x 600 x 100 mm with the words: "cable", "joint" or "conduit" impressed in top surface, and with arrows to indicate change in direction of cable and duct runs.
.2 Wooden post type markers: 89 x 89 mm, 1.5 m long, pressure treated with copper napthenate 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 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.

3.2 MARKERS

.1 Mark cable every 150 m along cable runs and changes in direction.
.2 Mark underground splices.
.3 Where markers are removed to permit installation of additional cables, reinstall existing markers.
.4 Install wooden post type markers.
.5 Lay concrete markers flat and centered over cable with top flush with finish grade.

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 for all new and modified underground conductors 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 Acceptance tests for all new and modified underground conductors:
  .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 Provide Owner's 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.
.7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

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 SWITCHES

.1 15 A, 120 V, single pole, double pole, three-way, four-way switches as indicated to: CSA-C22.2 No.55 and CSA-C22.2 No.111.

.2 Manually-operated general purpose AC switches with following features:
- .1 Terminal holes approved for # 10 AWG conductor.
- .2 Silver alloy contacts.
- .3 Suitable for side wiring.
- .4 White toggle.
- .5 Commercial specification grade.

.3 Toggle operated fully rated for LED drivers/lamps and up to 80% of rated capacity of motor loads.

.4 Switches of one manufacturer throughout project.

.5 Acceptable material:
- .1 Hubbel HBL 1201 W,
- .2 Leviton 1201-2W,
- .3 Pass and Seymour.

2.2 RECEPTACLES

.1 Duplex receptacles, CSA type as indicated, U ground, to: CSA-C22.2 No.42 with following features:
- .1 White 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 5-15 R:
    - .1 Cooper #CR15W.
    - .2 Hubbell #CR15WHI.
    - .3 Leviton #CR15-WH.
    - .4 Pass & Seymour #PS5262W.

2.3 COVER PLATES

.1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.
.2 Cover plates from one manufacturer throughout project.
.3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
.4 Stainless steel cover plates as indicated, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
.5 Sheet metal cover plates with turned-in corners for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
.6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with while-in-use gaskets for GFCI duplex receptacles indicated as weatherproof.
  .1 Acceptable manufacturer or approved equal.
    .1 Hubbell Taymac MM Series.
.7 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.
.8 All wiring device cover plates to be labeled using clear, self adhesive vinyl strips with black type lettering identifying panel and circuit number for each device. White vinyl strips will not be permitted.

3 Execution

3.1 INSTALLATION

.1 Switches:
  .1 Install single throw switches with handle in "UP" position when switch closed.
  .2 Install switches in gang type outlet box when more than one switch is required in one location.
  .3 Mount switches at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
.2 Receptacles:
  .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
  .2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
  .3 Do not use back entrances for connecting wiring devices to circuits. Wrap conductors around screw terminals and tighten. Tighten all unused screw terminals.
.3 Cover plates:
  .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.
  .2 Install suitable common cover plates where wiring devices are grouped.
  .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
  .4 Do not install outlet boxes back-to-back in wall; allow 150 mm horizontal clearance between boxes.

3.2 TESTING

.1 All new and modifed receptacles to be tested for voltage drop and results recorded where branch circuit voltage drop exceeds 3% from brand 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 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.

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 by the same manufacturer as the panelboard in which they are being installed.
.6 Circuit breakers to match panelboard interrupting capacity with minimum 10 kA at 208 V.
.7 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 and to ensure proper working operation and protection of components.

END OF SECTION

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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 Transportation & Infrastructure, and Department of Environment, Water and Climate Change, 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, 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 DESCRIPTION OF WORK

.1 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.

.2 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.

1.2 RELATED SECTIONS

.1 General Provisions and Contract Specifications for Highway Construction (2020).

.2 Section 31 23 00 - Excavation and Fill.

1.3 DEFINITIONS

.1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

.2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.

.3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.

.4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.

.5 Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments of specified size to not less than specified depth below existing ground surface.

1.4 QUALITY ASSURANCE

.1 Do construction in accordance with General Provisions and Contract Specifications for Highway Construction.

.2 Safety Requirements: worker protection.

.1 Workers must wear personal protective equipment at all times.

1.5 STORAGE AND PROTECTION

.1 Prevent damage to site features which are to remain.

.2 Repair damaged items to approval of Consultant. Replace trees designated to remain, if damaged, as directed by Consultant.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse in accordance with Waste Management Plan.

.2 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.

.1 Trim limbs and tops, and saw into saleable lengths of 2.4 m for saw logs, 2.4 m for pulpwood, 2.8 m for poles, 1.2 m for ties, and 1.2 m for fuel wood.

.2 Stockpile adjacent to site.

1.7 DEFINITION

.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.

1.8 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.

1.9 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.

1.10 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.

2 Products

2.1 MATERIALS

.1 Soil Material for Fill:
- .1 Excavated soil material: free of debris, rock, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
- .2 Remove and store soil material for reuse.

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 accordance with Par. 1.6 of this Section.

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 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and waterways, according to requirements of authorities having jurisdiction.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.6 PREPARATION

.1 Inspect site and verify with Consultant, items designated to remain.
.2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
  .1 Notify Consultant immediately of damage to or when unknown existing utility lines are encountered.
  .2 When utility lines which are to be removed are encountered within area of operations, notify Consultant a minimum of 48 hours prior to minimize interruption of service.
  .3 Notify utility authorities before starting clearing.
  .4 Keep roads and walks free of dirt and debris.

3.7 CLEARING

.1 Clearing includes felling, cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, occurring within cleared areas.
.2 Clear as indicated by Consultant, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.
.3 Cut off branches overhanging area cleared as directed by Consultant.
.4 Cut off unsound branches on trees designated to remain as directed by Consultant.

3.8 CLOSE CUT CLEARING

.1 Close cut clearing to ground level.
.2 Perform close cut clearing by hand so that existing muskeg is not damaged.
.3 Cut off branches overhanging area cleared as directed by Consultant.
.4 Cut off unsound branches on trees designated to remain as directed by Consultant.

3.9 ISOLATED TREES

.1 Cut off isolated trees as indicated by Consultant at height of not more than 300 mm above ground surface.
.2 Grub out isolated tree stumps.
.3 Prune individual trees as indicated or directed by Consultant.
.4 Trim trees designated to be left standing within cleared areas of dead branches 40 mm or more in diameter; and trim branches to heights as indicated.

.5 Cut limbs and branches to be trimmed close to bole of tree or main branches.
.6 Paint cuts more than 3 cm in diameter with approved tree wound paint.

3.10 UNDERBRUSH CLEARING

.1 Clear underbrush from areas as indicated at ground level.

3.11 GRUBBING

.1 Remove and dispose of roots larger than 75 mm in diameter, matted roots, and designated stumps from indicated grubbing areas.
.2 Grub out stumps and roots to not less than 200 mm below ground surface.
.3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m3.
.4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.12 REMOVAL AND DISPOSAL

.1 Remove cleared materials off site.

3.13 FINISHED SURFACE

.1 Leave ground surface in condition suitable for immediate grading operations to approval of Consultant.

3.14 CLEANING

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

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, which includes, but is NOT necessarily limited to:

- .1 Building:
  - .1 All excavation, as required, through compacted structural fill and/or undisturbed in-situ material for building foundations, including all related backfilling and compaction.
  - .2 Supply and installation of all structural fill for concrete floor slab.
  - .3 Supply and installation of both vertical and/or horizontal perimeter insulation.
  - .4 All excavation, trenching, bedding, backfilling and compaction required for the work of Mechanical and Electrical Divisions inside the building.
- .2 Outside of building:
  - .1 All excavation, as required, through compacted structural fill and/or undisturbed in-situ material for concrete aprons, including all related backfilling and compaction.
  - .2 Supply and installation of all structural fill and granular base for concrete pads.
  - .3 All excavation, trenching, bedding, backfilling and compaction required for the work of Mechanical and Electrical Divisions outside the building.
  - .4 All areas under sidewalks, aprons, slabs and roadways.
  - .5 All excavation and backfill for miscellaneous site items.

.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 and Infrastructure Specifications are to be followed for all work relating to the material specifications for fill materials and bedding sand within the foundation walls for the Building.

- .1 401 - Aggregate
- .2 402 - Bedding Sand

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete
.2 Section 33 05 13 - Manholes and Structures.
.3 Section 33 11 13 - Public Water Utility Distribution Piping.
.4 Section 33 41 13 - Public Storm Utility Drainage Piping.

1.3 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.

1.4 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.

.2 Rock:
.1 Any solid material in excess of 1.00 m 3 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
2.00mm	100
0.10mm	45-100
0.02mm	10-80

SIEVE DESIGNATION	% PASSING
0.005mm	0-45

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 SHORING BRACING AND UNDERPINNING

.1 Comply with Division 01 - General Requirements 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.

1.10 COMPACTION DENSITIES

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

1.11 GENERAL REQUIREMENTS

.1 Following excavation for building foundations, the Owner's Geotechnical Engineer will visually inspect the exposed underlying material and issue instructions with respect to the extent of the excavation, backfilling and compaction work required for the foundation walls.
.2 Do not proceed with any excavation work until instructions with respect to the extent of the work have been received from the Consultant. The cost of any geotechnical investigation work resultant from the Consultant's visual inspection will be borne by the Owner.
.3 For bidding purposes include for the removal of all existing in-situ material within the limits of the foundation walls down to the bottom of the new footings.
.4 For bidding purposes include for the supply, installation and compaction of Select Borrow fill from the bottom of the new footings, up to the underside of the granular base for the floor slab.
.5 If, resultant from the Consultant's inspection, the underlying material is found to be acceptable, or acceptable in part, as a sub base for the structural fill and granular base for the floor slabs, the Contractor shall submit a credit quotation for the deletion or partial deletion of the excavation, backfilling and compaction work.

1.12 SUBMITTALS

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

1.13 DELIVERY, STORAGE AND HANDLING

.1 Storage and Protection:
  .1 Protect existing features in accordance with Division 01 - General Requirements 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 and Infrastructure Specification 401 - Aggregate, for Class 'A' material graded within the following limits:

ASTM SIEVE SIZE	PERCENT PASSING
31.55mm	100
25.0mm	95-100
12.5mm	50-83

ASTM SIEVE SIZE	PERCENT PASSING
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 and Infrastructure Specification 401 - Aggregate, for Class 'B' material graded within the following limits:

ASTM SIEVE SIZE	PERCENT PASSING
31.55mm	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

.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 and Infrastructure Specification 402 - Bedding Sand, graded with the following limits:

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 and 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:

SIEVE SIZE	PERCENT PASSING
12.5mm	100
4.75mm	90-100
0.85mm	40-100
0.35mm	0-75

SIEVE SIZE	PERCENT PASSING
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 and Infrastructure Specification 401 - Aggregate for Class 'D' Material.

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 **Insulation:** Rigid insulation, Board insulation adhesive: Type A to CGSB 71-GP-24M, Type 2 (trowel applied), Class A.
- .1 Acceptable Material:
  - .1 Owens Corning Foamular C-600 or approved equal.

.9 Filter Fabric:
- .1 Filter light-weight, non-woven polypropylene fiber fabric, needle punched and heat set.

.10 Polyethylene film: 6 mil and 10 mil thickness.

.11 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 swap-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.
.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

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.
.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 Remove concrete and other obstructions encountered during excavation.
.3 Excavation must not interfere with normal 45° bearing splay of adjacent foundations.
.4 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.
.5 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.
.6 For trench excavation, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 5m at end of day's operation.
.7 Keep excavated and stockpiled materials safe distance away from edge of trench.
.8 Restrict vehicle operations directly adjacent to open trenches.
.9 Dispose of surplus and unsuitable excavated material in approved location on site.
.10 Do not obstruct flow of surface drainage or natural watercourses.
.11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
.12 Notify Consultant when bottom of excavation appears unsuitable.
.13 Obtain Consultant's approval of completed excavation.
.14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.
.15 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.
.16 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.
.17 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.

3.11 FILL TYPES AND COMPACTION

.1 Dimensions specified in following paragraphs are minimum dimensions of fill after compaction.
.2 Exterior Concrete, Roadways, Parking Lot, and within Building footprint:
  .1 Backfill with Type 5 fill (select borrow) up to underside of granular base for concrete aprons at building exterior.
  .2 Level granular base to accommodate full thickness of concrete aprons and pads.
.3 Underground services:
  .1 Use Type 4 Fill (bedding sand) 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%.

3.12 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.

3.13 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 perimeter foundation walls.
  .1 Do NOT place fill material against perimeter foundation walls until:
    .1 Concrete has cured for a minimum of 14 days.
    .2 Floor structures are permanently in place, unless approved by Consultant. Provide bracing as directed by Consultant and leave in place until removal is approved by Consultant.
    .3 Exercise care not to damage insulation at interior face of foundation walls and polyethylene slip sheet at exterior face of the foundation walls.
.5 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 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    .1 Permit concrete to cure for minimum of 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval has been obtained from Consultant or:
    .2 If approved by Consultant erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.
  .5 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.
  .6 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 SLIP SHEET/BOND BREAKER

.1 Polyethylene Slip Sheet/Bond Breaker
  .1 Install 10mil polyethylene slip-sheet at exterior face of all foundation walls from top of footing to future finished grade. Provide temporary support until backfilling is completed.

3.15 TESTING AND INSPECTION

.1 The responsibilities for test and payment will be as outlined in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

3.16 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.

3.17 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.

END OF SECTION

1 General

1.1 PROTECTION

.1 Protect in accordance with Division 01 - General Requirements.
.2 Protect existing items designated to remain. In event of damage, immediately replace such items or make repairs to approval of Consultant and at no additional cost to Owner.
.3 Prevent movement, settlement or damage of existing bridge, adjacent utilities, paving, and adjacent grades. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
.4 If safety of structure being repaired or utilities appear to be endangered, cease operations and notify Consultant. Take precautions to support structures. Do not resume operations until permission is granted by Consultant.

1.2 DESCRIPTION OF WORK

.1 Perform all demolition and removal as specified in this Section and indicated on the Drawings, which includes but is NOT limited to the items referenced under PART 3 - EXECUTION.

2 Products

2.1 NOT APPLICABLE

.1 Not applicable.

3 Execution

3.1 PREPARATION

.1 Inspect site and verify with Consultant items designated for removal and items to be salvaged and re-used.
.2 During demolition work provide protection to structure along adjacent properties.
.3 There are electrical wiring and underground services. Locate and protect utility lines and services. Preserve in operating condition active utilities traversing site. Contractor is financially responsible for replacing damaged utilities.

3.2 DEMOLITION AND REMOVAL

.1 Remove items indicated for removal as indicated on drawings and as required to complete the work.
.2 Minimize dusting and keep dusty materials wetted.

3.3 PROTECTION

.1 Take all necessary precautions and provide all bracing, shoring, and underpinning to support structure, structures undergoing demolition, adjacent services, roads and walks, landscaping and grading.
.2 If during the demolition work a situation should develop or a condition be exposed which has the potential to endanger the safety of the workers, occupants or users of the structure in which demolition work is being carried out, or pedestrians and vehicles the Contractor will, cease operations, take whatever emergency action, in the Contractor's opinion, is required to ensure the immediate safety of the workers, users and notify the Consultant before continuing with the work
.3 Prevent debris from blocking surface drainage, or from damaging or otherwise interfering with mechanical and electrical systems, which must remain active, and/or in place.

3.4 DISPOSAL OF MATERIAL

.1 Dispose of all removed materials off site.

.2 Except where indicated to be re-used all removed materials become the property of the Contractor and are to be removed from the site and disposed of in a manner and in a location acceptable to Provincial Authority governing such disposal.

.3 Do not sell, burn or bury materials on site.

.4 Pay all fees that may be charged to dispose of materials at licensed disposal sites.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 20 00 - Concrete Reinforcing.
.2 Section 03 30 00 - Cast-in-Place Concrete.
.3 Section 31 23 00 - Excavation and Fill.
.4 Section 33 41 13 - Public Storm Utility Drainage 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 Division 01 - General Requirements.
.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. Units to have integral precast base section with benching at sanitary manholes and performed gasketed openings for pipes. Exterior of sanitary manholes to be wrapped with blue skin waterproofing.
  .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 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 in 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 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 Section 03 30 00 - Cast-in-Place Concrete.

.2 Place concrete reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 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

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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 REFERENCES

.1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
- .1 ANSI/AWWA A100-(90), Water Wells
- .2 ANSI/AWWA C200-97, Steel Water Pipe - 6 in (150 mm) and Larger.
- .3 ANSI/AWWA C206-97, Field Welding of Steel Water Pipe.
- .4 ANSI/AWWA C208-01, Dimensions for Fabricated Steel Water Pipe Fittings.
- .5 ANSI/AWWA C654-99, Disinfecting Water Mains.
- .6 ANSI/AWWA C800-01, Underground Service Line Valves and Fittings (Also Included: Collected Standards for Service Line Materials).

.2 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A53/A53M-02, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
- .2 ASTM A307-02, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

.3 American Water Works Association (AWWA)/Manual of Practice
- .1 AWWA M11-1989, Steel Pipe - A Guide for Design and Installation.

1.3 SUBMITTALS

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

.2 Submit copy of Groundwater Exploration permit as required by the PEI Environmental Department, prior to drilling.

1.4 CLOSEOUT SUBMITTALS

.1 Provide data to produce record drawings, list of equipment, details of pipe material, location of air and vacuum release valves, maintenance and operating instructions in accordance with Division 01 - General Requirements.
- .1 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, and valve chambers.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling 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 Dispose of unused disinfection material at official hazardous material collections site.

.9 Do not dispose of unused disinfection material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

.10 Fold up metal banding, flatten and place in designated area for recycling.

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.
.3 Notify Consultant minimum of 72 h in advance of interruption in service.

1.7 REPORTS

.1 On completion of work, submit to Engineer report containing:
  .1 Log of well drilling.
  .2 Geophysical logs.
  .3 Record drawing of well including:
    .1 Elevations.
    .2 Size and length of each casing section installed.
    .3 Grouting details
  .4 Records of all static water level measurements times at which they were taken and any observable changes in static water level with well depth.
  .5 Results of interim and final pumping tests.
  .6 Well development data.
  .7 Results of testing of water sample for suspended solids, chemical and bacteriological content.

2 Products

2.1 PERMANENT WELL CASING

.1 10" casing to ANSI/AWWA, C200 ASTM, A 53, ASTM F480.
.2 Use pipe fittings of same standard as pipe casing.
.3 Joints: welded or threaded couplings.
.4 PVC or ABS pipe to be manufactured from virgin resin.

3 Execution

3.1 PREPARATION

.1 Clean pipes, fittings, valves, 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 DRILLING

.1 Drill holes plumb and straight.
.2 Ensure drilling methods do not impair production from aquifers encountered.
.3 Prevent foreign matter from entering bore hole and prevent contaminated water or other objectionable fluids from reaching aquifer through bore hole.
.4 Cover top of bore hole to prevent tampering and eliminate dangerous conditions for persons or animals in area.
.5 Maintain log of all bore holes including following information:
  .1 Depth of changes in formation.
  .2 Description of formations encountered.
  .3 Elevations at which aquifers are encountered, sudden changes in water level, loss of drilling fluid or other indications of permeable strata.
.6 In unconsolidated formations, obtain duplicate soil samples from each 10" of depth drilled and at least one set of duplicate samples from each formation encountered. Submit samples to Engineer with identification data on drill hole and depth.

.7 Obtain continuous samples for at least 25' through aquifer to be screened using split spoon sampling or other method approved by Engineer.
.8 In consolidated formation, obtain one rock sample from each 20' of depth drilled.
.9 Conduct well development and pumping tests, and obtain clear water samples as directed by Engineer.
.10 Be prepared to control, shut off and/or seal hole should flowing artesian water or gas be encountered.
.11 Equip arterial wells with variable flow control device to control rate of flow after completion. Stop flow of water for period of not less than 48 h by closing control device, and determine if well is effectively sealed to prevent escape of water from annular space of well and its immediate vicinity. Seal off water by grouting as necessary.
.12 Seal abandoned holes by approved methods with concrete, cement bentonite grout, other material approved by Engineer.
.13 Re-drill holes lost due to caving or abandoned due to loss of drilling equipment at no cost to Engineer.

3.3 PERMANENT CASING INSTALLATION

.1 Clean casing pipe and fittings prior to installation.
.2 Install permanent well casing to sizes and depths as suited to formation(s) encountered.
.3 Protect PVC or ABS pipe casing against damage by enclosing upper within steel casing.
.4 Center casing by use of centering brackets and install so that variance from vertical does not exceed two thirds internal diameter of casing per 100' of depth.
.5 Seal annular space between casing and borehole wall by grouting, to prevent entrance of surface water or other deleterious matter into aquifer, and to prevent intermixing of water.
.6 After grouting is completed, cut off casing squarely and neatly, maximum 18" above ground level and minimum 2' above highest recorded flood level.
.7 Maintain accurate records of casing lengths and sizes installed.

3.4 DISINFECTION

.1 After well has been completely constructed, thoroughly clean of foreign substances, including tools, timbers, rope, cement, oil, grease, joint dope and scum. Thoroughly swab casing pipe using alkalis if necessary to remove oil, grease or joint dope.
.2 Disinfect well in accordance with ANSI/AWWA C654.

3.5 TEST PUMPING

.1 Equipment requirements:
  .1 Pump with variable pumping rate up to capacity of at least 50 USGpm and capable of operating a minimum of 12 hrs without interruption.
  .2 Discharge piping of sufficient size and length to conduct water being pumped during test to an approved point of discharge where it will not recharge aquifer, damage property or create nuisance and equipped with valve close to pump.
  .3 Apparatus to measure rate of pump discharge shall be an orifice plate with transparent tube to measure water head upstream of plate, or suitable water meter.
  .4 Apparatus to measure pumping level shall be an electric sounder or calibrated air line.
  .5 Perform 12-hour pump test on wells (or as required by regulations) to determine the expected water flow rate and draw down.
  .6 Test shall be performed in accordance with all local regulations and guidelines of the authority having jurisdiction.
  .7 Provide test report to engineer for final pump sizing.

END OF SECTION

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1 General

1.1 RELATED WORK

.1 Section 03 20 00 - Concrete Reinforcing.
.2 Section 03 30 00 - Cast-In-Place Concrete.
.3 Section 31 23 00 - Excavation and Fill.
.4 Section 33 05 13 - Manholes and Structures

1.2 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishings of all labour, materials and equipment necessary for the supply and installation of a new storm sewer system, c/w new manhole/catch basin/catchment tee laterals and all associated items all as indicated on the drawings, including all testing and flushing.

1.3 REFERENCES

.1 ASTM D 2680-95, Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
.2 ASTM D3034-98, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer pipe and fittings.
.3 ASTM F 405-93, Specification for Corrugated Polyethylene (PE) Tubing and Fittings.
.4 ASTM F 667-95, Specification for large Diameter Corrugated Polyethylene Tubing and Fittings.
.5 ASTM F 794-95, Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
.6 CSA B182.2-95, "PVC Sewer Pipe and Fittings".
.7 CAN/CSA-B182.1-M92, Plastic Drain and Sewer Pipe and Pipe Fittings.
.8 CSA-B182.2-95, PVC Sewer Pipe and Fittings (PSM Type).
.9 CSA-B182.2-95, PVC Sewer Pipe and Fittings (PSM Type).
.10 CSA B182.11-95, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
.11 CAN/ULC-5701-1997, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 SHOP DRAWINGS

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

1.5 SAMPLES

.1 Submit samples in accordance with Division 01 - General Requirements.
.2 Inform Consultant at least (4) weeks prior to commencing work, of proposed source of bedding materials.
.3 Submit to Consultant at least (2) weeks prior to commencing work, test results for materials proposed for use.

1.6 MATERIAL CERTIFICATION

.1 Submit manufacturer's test data & catalog literature, at least (2) weeks prior to commencing work, confirming that pipe materials intended for use meet requirements of this Section.
.2 Certification to be marked on pipe.

1.7 MANUFACTURERS INSTRUCTIONS

.1 When requested by Consultant, make available copy of manufacturer's installation instructions.

1.8 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.

1.9 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 PLASTIC PIPE AND FITTINGS

.1 Type PSM Poly (Vinyl Chloride) to CSA-D3034-98.
  .1 Standard Dimensional Ratio (SDR) 35 with minimum pipe stiffness of 317 Kpa.
  .2 Locked-in steel reinforced gasket and integral bell system.
  .3 Nominal lengths: 4m
  .4 Size as indicated
  .5 Acceptable material:
    .1 IPEX "Ring Tite" PVC.
.2 Polyethylene Pipe to CSA B 182.6 & ASTM D 3212.
  .1 Double Wall - smooth walled interior and corrugated exterior for highway loading CS-660.
  .2 Gasket bell and spigot assembly
  .3 Nominal lengths: 6m
  .4 Size as indicated.
  .5 Acceptable material:
    .1 Soleno "Solflo Max".

2.2 CONCRETE PIPE AND FITTINGS

.1 Reinforced circular concrete pipe and fittings to ASTM C76, C655 and CSA A 257-2, Class II, designed for gasketed joints.
.2 Acceptable material:
  .1 Shaw Pipe Products

2.3 PIPE BEDDING MATERIALS

.1 Granular Material
  .1 Gradation to within specified limits when tested to ASTM C136-84a and ASTM C117-84 and giving smooth curve without sharp breaks when plotted on semi log grading chart.
  .2 Bedding Sand: Natural sand or crushed rock screenings to following grading requirements.

ASTM Sieve Size	% Passing
9.50mm	100
4.75mm	50-100
2.00mm	30-90
425 micrometers	10-50
75 micrometers	0-10

  .3 Bedding stone: crushed stone or crushed gravel to following grading requirements.

ASTM Sieve Size	% Passing
22.40mm	100
16.00mm	75-100
12.50mm	65-90
4.75mm	35-55
1.18mm	15-45
300 micrometers	5-22
75 micrometers	0-8

.4 Concrete required for cradles, encasement, supports, to Section 03 30 00 - Cast-in-Place Concrete.

2.4 PIPE BEDDING AND COVER MATERIALS

.1 Granular bedding to requirements of Section 31 23 00 - Excavation and Fill.
.2 Concrete required for cradles, encasement, supports: 25Mpa strength at 28 days, cast-in-place concrete to the requirements of CAS A23.2 and A23.2.

2.5 BACKFILL MATERIAL

.1 As indicated and to the requirements of Section 31 23 00 - Excavation and Fill.

2.6 PIPE INSULATION

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

3 Execution

3.1 PREPARATION

.1 Clean pipes and fittings of accumulated debris and water before installation and remove defective materials from site.

3.2 TRENCHING AND BACKFILLING

.1 Do trenching and backfilling work to Section 31 23 00 - Excavation and Fill.
.2 Do not allow contents of any sewer or sewer connection to flow into trench.
.3 Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.
.4 Do not backfill trenches until pipe grade and alignment have been checked and accepted by Consultant.

3.3 GRANULAR BEDDING AND COVER

.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 pipe. Do not use blocks when bedding pipe.
.3 Shape transverse depressions as required to suit joints.
.4 Compact each layer full width of bed to at least 95% corrected maximum dry density.
.5 Fill excavation below bottom of specified bedding adjacent to manholes, catch basins or structures with select borrow sandstone fill.

3.4 INSTALLATION

.1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
.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 grad 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.
.4 Commence laying at lower end and proceed in upstream direction with socket ends of pipe facing upgrade.
.5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
.6 Do not allow water to flow through 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: Position and Join pipes by approved method and in strict accordance with manufacturer's recommendations. Do not use excavation equipment to force pipe sections together.
.9 When any stoppage of work occurs, restrain pipes as directed to prevent "creep" during down time.
.10 Cut pipes as required for 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 connection 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 connection for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight, and where applicable acceptable to Provincial or Municipal authority.
.13 Upon completion of pipe laying and after Consultant has inspected pipe joints, place specified granular material to dimensions indicated or directed by Consultant. Remainder or trench to be backfilled to sub-grade level as indicated and specified.
.14 Temporary plug open upstream ends of pipes with removal watertight concrete, steel or plastic bulkheads.

3.5 FROST INSULATION

.1 Provide insulation as detailed on the Drawings in the locations indicated or as directed. Install pipe insulation to width and thickness indicated with underside 150mm above top of pipe. Extend minimum 600mm wide around manhole at same elevation.

3.6 FIELD TESTING

.1 Repair or replace pipe, pipe joint or bedding material 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 Assist and provide means of access to permit Consultant to do inspections.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Materials and installation for aboveground oil storage tanks.

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.
.2 Section 23 11 13 - Facility Fuel-Oil Piping.
.3 Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

.1 American National Standards Institute (ANSI).
  .1 ANSI/NFPA-329-99, Handling Underground Releases of Flammable and Combustible Liquids.
  .2 ANSI/API 650-2000, Welded Steel Tanks for Oil Storage.
.2 American Petroleum Institute (API).
  .1 API RP 651-1997, Cathodic Protection of Aboveground Petroleum Storage Tanks.
  .2 API STD 653-R01, Tank Inspection, Repair, Alteration, and Reconstruction.
.3 American Society for Testing and Materials International, (ASTM).
  .1 ASTM C618-01, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
.4 Canadian Council of Ministers of the Environment (CCME).
  .1 CCME-PN1326-2004, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
.5 Department of Justice Canada (Jus).
  .1 Canadian Environmental Protection Act, 1999 (CEPA).
.6 Canadian Standards Association (CSA)/CSA International.
  .1 CAN/CSA-B139-00, Installation Code for Oil Burning Equipment.
.7 The Master Painters Institute (MPI).
  .1 Architectural Painting Specification Manual - September 2002.
.8 National Research Council/Institute for Research in Construction.
  .1 NRCC 38727, National Fire Code of Canada (NFC)-1995.
.9 Transport Canada (TC).
  .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
.10 Underwriters' Laboratories of Canada (ULC).
  .1 ULC/ORD-C58.9-97, Secondary Containment Liners for Underground and Aboveground Tanks.
  .2 ULC/ORD-C58.12-92, Leak Detection Devices (Volumetric Type) for Underground Storage Tanks.
  .3 ULC/ORD-C58.14-92, Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks.
  .4 ULC/ORD-C58.15-92, Overfill Protection Devices for Underground Tanks.
  .5 ULC/ORD-C107.4-92, Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids.
  .6 ULC/ORD-C107.7-93, Glass-Fibre Reinforced Plastic Pipe and Fittings.
  .7 ULC/ORD-C107.19-92, Secondary Containment of Underground Piping.
  .8 ULC/ORD-C142.23-91, Aboveground Waste Oil Tanks.
  .9 ULC-S601-2000, Aboveground Horizontal Shop Fabricated Steel Tanks.
  .10 CAN/ULC-S602-92, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil.
  .11 CAN/ULC-S603.1-92, Galvanic Corrosion Protection Systems for Steel Underground Tanks.
  .12 ULC-S630-93, Aboveground Vertical Shop Fabricated Steel Tanks.

.13 ULC-S652-93, Tank Assemblies for Collection of Used Oil.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse in accordance with Division 01 - General Requirements.
.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
.3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
.4 Separate for reuse and place in designated containers Steel waste in accordance with Waste Management Plan.
.5 Place materials defined as hazardous or toxic in designated containers.
.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
.8 Ensure emptied containers are sealed and stored safely.
.9 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
.10 Divert unused concrete materials from landfill to local quarry as approved by Departmental Representative.
.11 Dispose of unused paint or coating material at an official hazardous material collections site as approved by Departmental Representative.
.12 Do not dispose unused paint material must into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
.13 Fold up metal banding, flatten and place in designated area for recycling.

2 Products

2.1 PIPING, VALVES AND FITTINGS

.1 In accordance with Section 23 11 13 - Facility Fuel Oil Piping.
.2 Piping located below product level equipped with either manual or automatic shut-off at storage tank.
.3 Provide means for collecting spills at connection point between storage tank system and delivery truck, rail car, or vessel.

2.2 GROUNDING AND BONDING

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

2.3 RELOCATED TANKS

.1 Shop-fabricated AST (for use aboveground for storing of petroleum products).
  .1 Inspection and testing.
    .1 To requirements of Authority Having Jurisdiction (AHJ).
    .2 Provide for visual inspection of tank, using boroscope camera. Provide written report to Consultant.

2.4 SPILLS, OVERFILLS AND STORM RUNOFF WATER

.1 Contained, treated and disposed of in accordance with applicable provincial or territorial regulations, guidelines and policies.

3 Execution

3.1 INSTALLATION

.1 Install tanks in accordance with CAN/CSA-B139 and National Fire Code of Canada and manufacturer's recommendations and CCME PN 1326.

.2 Position tanks using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.
.3 Install tanks using licensed installers.
.4 Provide certification of installation to Departmental Representative.

3.2 FIELD QUALITY CONTROL

.1 Test tanks for leaks to requirements of Owner and in presence of Authority Having Jurisdiction (AHJ).

3.3 TOUCH-UP

.1 Where coating is damaged, touch-up with original coating material.

3.4 LEVEL GAUGE SYSTEM

.1 Provide leak and vapour proof caulking at connections.
.2 Shield capillary and tubing connections in heavy duty 50 mm polyethylene pipe.
.3 Calibrate system.

3.5 LEAK DETECTION SYSTEM

.1 Install in accordance with manufacturer's recommendations.

END OF SECTION

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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 1/4" stranded nylon pull rope tensile strength 5 kN.

2.4 MARKERS

.1 6" 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

APPENDICES

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GEOTECHNICAL INVESTIGATON REPORT

Kings County Highway Depot Building Additions & Site Modifications

PID#s 154948 & 630582
12 Old Cheese Factory Road
Bridgetown
Kings County
Prince Edward Island

Project # 210832
September 27, 2021

Prepared for:
Prince Edward Island Department
of Transportation and Infrastructure
c/o Derryl MacDonald
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Introduction

EastTech Engineering Consultants Inc. was retained by the Prince Edward Island Department of Transportation and Infrastructure (PEIDTI) to complete a geotechnical investigation at the Kings County Highway Depot located at 12 Old Cheese Factory Road in Bridgetown, Kings County, Prince Edward Island (see Figure 1 in Appendix I). Additions to the existing depot building and warehouse have been proposed on the site, along with a new bus parking area. The purpose of this geotechnical investigation was to collect detailed information pertaining to the soils, bedrock, and groundwater conditions on the site and to provide recommendations and support for the design of the foundations for the building additions and parking lot area, as well as the general earthworks associated with the project.

Scope of Work

In agreement with the PEIDTI, the following scope of work has been completed as a part of this geotechnical investigation:

- ✓ A preliminary evaluation of the underground services that might be present on or in the immediate vicinity of the dig areas was conducted with representatives from Prince Edward Island Department of Transportation and Infrastructure.
- ✓ Six (6) geotechnical test pits were excavated on the site to collect geotechnical data for this investigation.
- ✓ Laboratory analysis was conducted on samples of soils collected from the site to determine particle size distribution of soils deemed appropriate for bearing soils.
- ✓ A geotechnical report outlining the findings of this investigation, detailed test pit logs, and recommendations for the building foundation design and project earthworks has been included herein.

Site Description & Proposed Development

The site is an highway depot that serves Kings County, Prince Edward Island with an existing depot building, warehouse storage building, storage / material laydown area, and parking areas for site staff and for the storage of heavy equipment. The topography of the site and surrounding area trends moderately towards the south at a gradient of 2-5%. A site plan showing the existing buildings and site infrastructure, along with the proposed locations of the building expansion areas and bus parking location has been included as Figure 2 in Appendix I.

Site Geology

The bedrock formations that are predominantly found in the province of Prince Edward Island consist of the characteristically red colored flat lying sedimentary deposits commonly referred to as the PEI Redbeds. The PEI Redbeds are a part of the Pictou Group of deposits that make up a section of the Maritime Plane and lie within the Appalachian Mountain System. The PEI Redbeds can be broken down into four cyclic sequences generally comprised of conglomerate, sandstone, and siltstone, from the Late Pennsylvanian to Early Permian ages (*i.e.*, formed 286 million years ago to 320 million years ago) which fine upward (i.e., conglomerate at the base and siltstone at the top), with the oldest deposits found along the south shore of the island and the youngest found along the north shore. The PEI Redbeds generally dip 1 – 3 degrees towards the northeast.

Bedrock in Prince Edward Island is generally covered by a thin drift of Ground Moraine or Basal Till with occurrences of Residual, Ablation Till, and minor Glaciofluvial and Marine Deposits. Basal Till, which

covers approximately 75% of the province are often local in origin and can be generally described as reddish brown, strongly acid, and compact to dense soils further defined by their Clay and Silt content.

An initial review of available soils information for the area revealed that the natural surficial soils identified on the site consist of the Culloden type soils, which are described as a rapid draining, strongly acid, coarse textured glaciofluvial deposits on undulating to rolling relief (Soils of Prince Edward Island – Agriculture Canada [1988]).

Geotechnical Site Work

On Wednesday September 8th, 2021, EastTech Engineering staff were on-site to complete the fieldwork for this geotechnical investigation. Six (6) test pits were excavated on this date using a track mounted excavator provided by Cardigan Excavators Ltd. under the direction of Dave Richard, CET, of EastTech Engineering. The test pit locations have been included with this report as Figure 2 in Appendix I.

Summary Site Findings

Soils encountered during this geotechnical investigation can be generally described as a surficial layer of Topsoil & Rootmat consisting of Brown to Gray to Orange Brown Silty Sand with Traces of Roots & Organics overlying a deposit of Glacial Till comprised of Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles. Fill materials were identified over the Glacial Till deposits in the test pit put down in the area of the proposed warehouse addition (TP4). Bedrock was not encountered in any of the test pits. Groundwater was observed test pit TP1 at a depth of 1.53 meters.

A more detailed account of the sub-surface conditions that were encountered in this investigation can be found in the test pit logs that have been included in Appendix II.

Laboratory Analysis of Site Soils

Representative soil samples were collected from several of the test pit locations and tested for field moisture content and particle size analysis in EastTech Engineering's soils laboratory. The results off this analysis are summarized in the table below. The Glacial Till material that was identified in this investigation is predominantly comprised of Sand and Silt sized particles with Some Gravel sized particles. The presence of cobbles in the Glacial Till deposit was estimated based on the visual observations made during the excavation of the test pits. The results from the particle size analysis tests have been summarized in the table below. Additional information regarding the particle size analysis tests can be found in the laboratory reports which have been included in Appendix IV for your review.

Sample Location	Sample Depth	Material	Field Moisture Content (%)	% Gravel	% Sand	% Silt & Clay
TP2	1.0 m	GLACIAL TILL – Silty Sand with Some Gravel and Traces of Cobbles	17.9	13.0	63.2	23.9
TP4	1.2 m – 2.1 m	GLACIAL TILL – Silty and Sand with Some Gravel and Traces of Cobbles	14.6	12.9	47.8	39.3

Site Preparation for Building Foundation Construction

Given the site conditions encountered in this investigation and nature of the proposed building expansion areas, we recommend that the foundations consist of conventional concrete perimeter strip footings, combined with concrete spread footings as required for the structural design. All footings should be supported by the insitu Glacial Till deposit, or by a building pad comprised of compacted Structural Fill prepared as described below.

Site preparation should consist of the removal of all existing Topsoil and Fill materials from the proposed building expansion areas. The excavations should extend into the undisturbed Glacial Till deposit that was identified at depths ranging from 0.66 m – 0.83 m below the existing ground surface in the locations of the building expansion areas. The insitu Glacial Till bearing surface should be inspected by a geotechnical consultant. Any soft, suspect, or deformable areas should be remediated at the discretion of the geotechnical consultant. All excavation walls should be cut back and sloped as per applicable PEI Occupational Health & Safety Regulations.

If any of the footings of the building expansion areas are to be installed above the elevation of the top surface of the insitu Glacial Till deposit, a Building Pad will be required to support the footings of the structure. The Building Pad should be constructed of structural fill meeting PEIDTI specifications for Select Borrow, or an alternative structural fill that has been approved by the geotechnical consultant. Structural fill should be placed in lifts not exceeding 300 mm in thickness and should be compacted to 100% of its Standard Proctor Dry Density at optimum moisture content. The outer edges of the top of the building pad should extend beyond the outer limits of the footings by a minimum of 600 mm. The toe of the building pad should extend outward from the outer edges of the pad at a minimum slope of 1H:1V. All Building Pad construction should be completed under the supervision of a geotechnical consultant to ensure that the required degree of compaction is achieved during the placement of the structural fill.

Footing Design Considerations

For limit state design (NBCC 2015), footings placed on the undisturbed Glacial Till or Structural Fill Building Pad constructed as described above has a bearing resistance of 300 kPa at the Ultimate Limit State (ULS). A maximum recommended bearing resistance for concrete strip and spread footings of 150 kPa is recommended for the above noted bearing soils for Serviceability Limit State (SLS) design, to prevent maximum total and differential settlements from exceeding 25 mm and 15 mm, respectively.

A ditching bucket should be used for excavations into the Glacial Till or Building Pad where footings are to be placed to minimize the disturbance of the bearing surface. Efforts should be made to direct surface water away from the Glacial Till bearing surface once it has been exposed as it may be susceptible to softening under conditions of high moisture. Traffic should also be minimized on the bearing surface if it becomes wet.

Foundation Backfilling

Backfill material placed in the building interior after the foundations have been installed should meet the current PEIDTI specification for Select Borrow or an equivalent structural fill that has been improved by the geotechnical consultant. All structural fill material placed within the building area should be installed and compacted in lifts to 100% of its Standard Proctor Maximum Dry Density at optimum moisture content. The lift thickness must be compatible with the compaction equipment used. A maximum lift thickness of 300 mm is recommended for all fill material placed during the backfilling of the building interior. Interior backfilling should be monitored by the geotechnical consultant to ensure that the required degree of compaction is achieved during placement.

Backfill material placed for the exterior foundation walls should also consist of Select Borrow compacted in lifts to 98% of its Standard Proctor Maximum Dry Density at optimum moisture content. Common Borrow or excavated Glacial Till from the site may be used in place of Select Borrow for exterior backfilling if the material can be maintained at a suitable moisture content prior to placement. Soils immediately surrounding the building should be graded to direct surface water away from the building's foundation once backfilling has been completed.

Concrete Slabs on Grade

The concrete floor slabs may be cast over structural fill installed as described above. The concrete floor slabs should be placed on a compacted free draining granular base material that is a minimum of 150 mm thick. Material meeting the PEIDTI specifications for Class A Gravel would be acceptable for use as concrete slab granular base material. If a radon gas ventilation system is going to be installed below the concrete floor slab, material meeting PEIDTI Specifications for Class D Drainage Gravel is recommended for this application. Granular base materials placed to support concrete floor slabs should be compacted to 100% of its Standard Proctor Dry Density at optimum moisture content. A vapor barrier is also recommended for use under all concrete slab on grade construction. Concrete floor slabs constructed as described may be designed with a modulus of subgrade reaction of 20 MN/m^3.

Site Seismic Classification

The proposed structure may be designed using a Site Seismic Classification of Class "D" as per the National Building Code of Canada building requirements (NBCC 2015).

Exterior Concrete Structures

Any exterior concrete structures such as sidewalks, curbs, or slabs that are to be installed should be supported by a minimum 300 mm granular sub-base and a 150 mm granular base constructed of material meeting the PEIDTI specifications for Select Borrow and Class A Gravel, respectively. Granular fills placed below exterior concrete structures should be compacted to 100% of their Standard Proctor Dry Density at optimum moisture content. All insitu subgrade soils should be inspected by the geotechnical consultant prior to the placement of sub-base and base granular materials. Any suspect areas in the insitu subgrade should be remediated at the discretion of the geotechnical consultant. Exterior concrete structures should be graded to allow for positive drainage as to avoid collection and retention of surface water.

Parking Lots & Driveway Areas

Site preparation for the bus parking location and any additional new parking lot and driveway areas that are to be constructed should consist of the excavation of existing Topsoil and Fill materials to the Glacial Till deposit prior to the placement of granular and asphalt materials as prescribed below. The subgrade soils at the base of the excavation should be compacted with a vibratory roller under the direct supervision of the geotechnical consultant. Efforts should be made to direct surface water away from subgrade soils below all parking lot and driveway areas, as they may be susceptible to softening under conditions of high moisture. Traffic should also be minimized on all subgrade soils if they become wet.

Excavated Glacial Till from site earthwork and grading activities may be used for cut fill activities in the proposed bus parking location under the direct supervision of the geotechnical consultant. If excavated Glacial Till is to be used for building pad construction it must be maintained at a suitable moisture content to allow for sufficient re-compaction of the material. The moisture content of the Glacial Till material must be kept within 2% of optimum moisture content based on a Standard Proctor Density Test if the material is to be reused for site grading activities. Efforts should be made to stockpile any Glacial Till that

is intended for re-use as to prevent excessive moisture from infiltrating the material if it is not to be used immediately after excavations are completed.

All parking lot and driveway areas should be graded to direct surface water to an appropriate discharge area such as perimeter ditching or catch basins connected to a stormwater management system as designated by the civil design engineer for the project. Grading of asphalt surfaces should be designed to minimize the ponding of surface water on the asphalt surfaces at all times.

For driveway and parking lot construction, the following quantities of materials are recommended using the installation procedures as provided in the table below:

Component	Material	Minimum Thickness	Installation Instructions
Asphalt	**B Seal**	**40 mm**	• Install as per PEIDTI General Provisions and Contract Specifications for Highway Construction. • Testing of asphalt hot mixes is recommended to ensure compliance with PEIDTI General Provisions and Contract Specifications for Highway Construction • Collection and testing of asphalt core samples is recommended after placement to evaluate thickness and compaction requirements as per PEIDTI General Provisions and Contract Specifications for Highway Construction.
	A Base	**60 mm**	
Granular Base	**Class A Gravel**	**150 mm**	• Material should comply with PEIDTI specifications for Class A Gravel. • Compact to 100% Standard Proctor Dry Density at Optimum Moisture Content • Material to be installed in one or two lifts.
Granular Sub-Base	**Select Borrow**	**300 mm**	• Material should comply with PEIDTI specifications for Select Borrow. • Compact to 100% Standard Proctor Dry Density at Optimum Moisture Content in one lift. • Additional Select Borrow, excavated site material, or an approved alternative may be required to build site up to desired subgrade elevations.

Winter Construction Activities

If construction activities are to be conducted during winter months or during periods when sub-zero temperatures are encountered, additional efforts must be made to ensure that all insitu bearing soils and Structural Fill Materials (*i.e.*, building pad materials, granular base, granular sub-base, *etc.*) are not subject to freezing conditions. The installation of winter shelters, heating sources, or other measures may be required to prevent bearing soils and structural fill materials from freezing. Efforts should also be made to ensure that structural fill materials are not subject to freezing conditions prior to their delivery to the site. Additional inspection and oversight by the geotechnical consultant is recommended during all winter construction activities associated with site earthworks, foundation installation, and parking lot / access road construction.

Limitations

The recommendations provided in this report are based on the observations made during the field investigation, the site conditions at the time of the investigation, and our understanding of the projects geotechnical requirements as documented herein. Further excavation or investigation may reveal unforeseen issues that may influence our recommendations. Furthermore, weather and seasonal conditions may also alter the geotechnical conditions on the site. As such, EastTech Engineering

Consultants Inc. should be notified immediately if the conditions as documented herein do not reflect the conditions on the site at the time of construction.

Conclusions & Closing Remarks

We trust that the information provided is sufficient for your current needs but do not hesitate to contact the undersigned if further clarification is required. We thank you for choosing EastTech Engineering Consultants Inc. as your geotechnical consultant for this undertaking.

Sincerely;

Chris MacPherson

Chris MacPherson *P.Eng. CESA*
EastTech Engineering Consultants Inc.

Appendix I

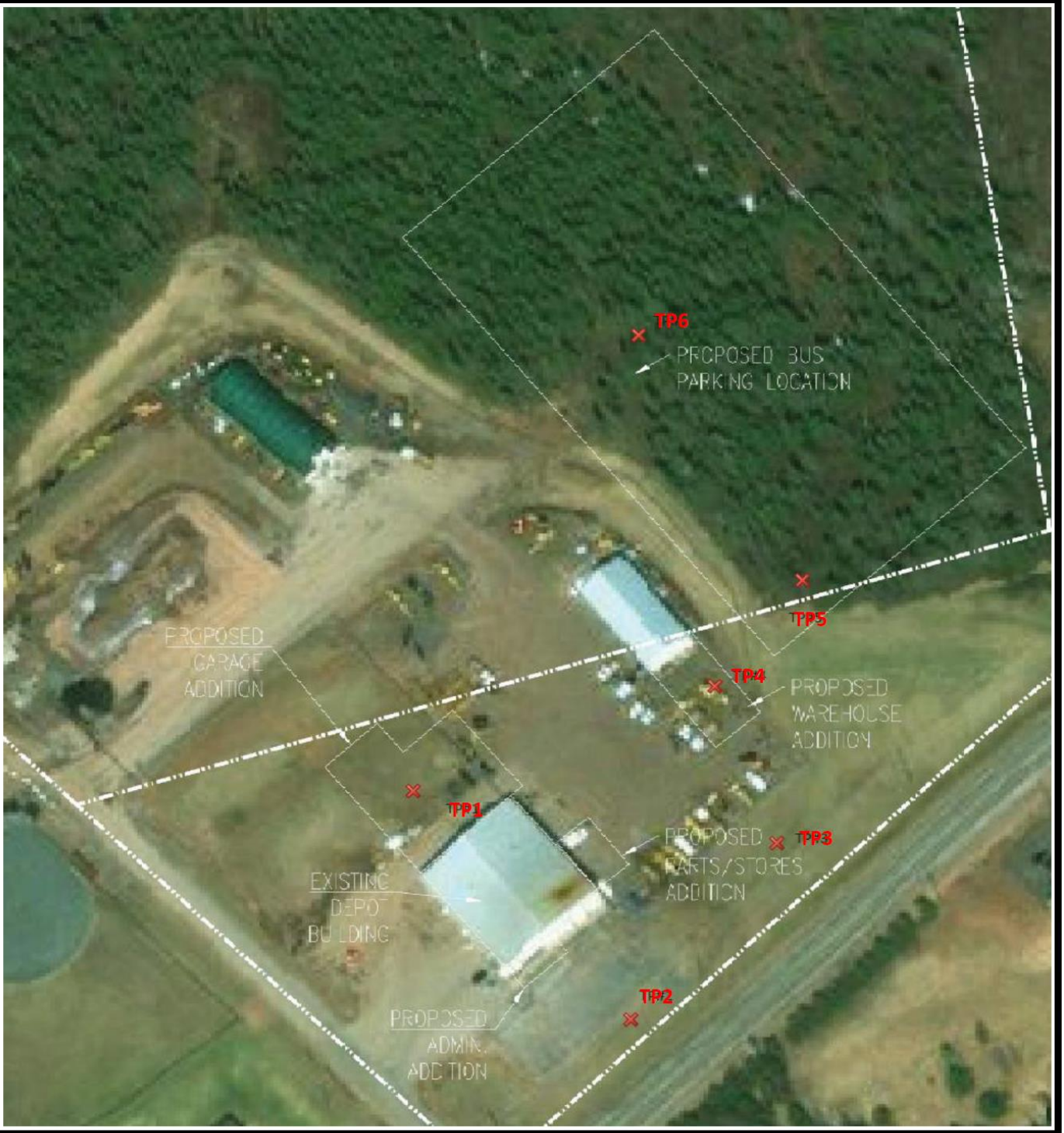
Figures

Project	**Kings County Highway Depot Additions & Site Modifications**
Project #	**210832**
Client	**PEI Department of Transportation & Infrastructure**
Location	**Bridgetown, Kings County, Prince Edward Island**
Figure Title	**Figure 1 - Test Pit Location Plan**

Comments

Aerial image showing the Kings County Highway Depot in Bridgetown, Kings County, Prince Edward Island, which was the subject of this geotechnical investigation.

Project	**Kings County Highway Depot Additions & Site Modifications**
Project #	**210832**
Client	**PEI Department of Transportation & Infrastructure**
Location	**Bridgetown, Kings County, Prince Edward Island**
Figure Title	**Figure 2 - Site Plan with Test Pit Locations**



Comments

Appendix II

Test Pit Logs

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GEOTECHNICAL TEST PIT LOG TP1

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 1.85 m
Datum	: Assumed	Groundwater Depth	: 1.53 m

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10		TOPSOIL & ROOTMAT - Loose Brown to Gray Green Slity Sand with Traces of Roots & Organics						
0.5	9.5								
1.0	9		GLACIAL TILL - Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles						
1.5	8.5			▼					
2.0	8								
2.5	7.5								
3.0									

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GEOTECHNICAL TEST PIT LOG TP2

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 1.83 m
Datum	: Assumed	Groundwater Depth	: N/A

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10		TOPSOIL & ROOTMAT - Loose Brown Orange Brown Slity Sand with Traces of Roots & Organics						
0.5	9.5		GLACIAL TILL - Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles						
1.0	9				17.9	13.0	63.2	23.9	
1.5	8.5								
2.0	8								
2.5	7.5								
3.0									

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GEOTECHNICAL TEST PIT LOG TP3

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 2.15 m
Datum	: Assumed	Groundwater Depth	: N/A

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10		TOPSOIL & ROOTMAT - Loose Brown Orange Brown Slity Sand with Traces of Roots & Organics						
0.5	9.5		GLACIAL TILL - Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles						
1.0	9								
1.5	8.5								
2.0	8								
2.5	7.5								
3.0									

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GEOTECHNICAL TEST PIT LOG TP4

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 1.83 m
Datum	: Assumed	Groundwater Depth	: N/A

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10								
			TOPSOIL FILL MIX - Loose Brown to Black Sand & Gravel with Some Slity Sand Topsoil and Traces of Roots & Organics						
0.5	9.5								
			GLACIAL TILL - Compact Reddish Brown Silt & Sand with Some Gravel and Traces of Cobbles						
1.0	9								
1.5	8.5				14.6	12.9	47.8	39.3	
2.0	8								
2.5	7.5								
3.0									

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GEOTECHNICAL TEST PIT LOG TP5

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 2.21 m
Datum	: Assumed	Groundwater Depth	: N/A

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10		TOPSOIL & ROOTMAT - Loose Brown Slity Sand with Some Large Roots & Organics						
0.5	9.5		GLACIAL TILL - Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles						
1.0	9								
1.5	8.5								
2.0	8								
2.5	7.5								
3.0									

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Geotechnical • Environmental • Materials Testing

GEOTECHNICAL TEST PIT LOG TP6

(Page 1 of 1)

Geotechnical Investigation
Kings County Highway Depot Building
Additions & Site Modifications

Bridgetown, Prince Edward Island

File# 210832

Client	: PEIDTI	Logged By	: D. Richard
Excavation Date	: September 08, 2021	Reviewed By	: C. MacPherson
Contractor	: Cardigan Excavators	Test Pit Elevation	: 10.0 m
Equipment	: Cat 305.5 Excavator	Test Pit Depth	: 2.25 m
Datum	: Assumed	Groundwater Depth	: N/A

Depth (m)	Elevation -10.0 m	GRAPHIC	DESCRIPTION	Groundwater	% Moisture	% Gravel	% Sand	% Fines < #200	REMARKS
0.0	10		TOPSOIL & ROOTMAT - Loose Brown to Orange Brown Slity Sand with Traces of Roots & Organics						
0.5	9.5		GLACIAL TILL - Compact Reddish Brown Silty Sand with Some Gravel and Traces of Cobbles						
1.0	9								
1.5	8.5								
2.0	8								
2.5	7.5								
3.0									

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Appendix III

Borehole & Test Pit Log
Symbols Key Descriptions & Glossary of
Technical Terms

Borehole & Test Pit Log Symbols Key
Descriptions & Glossary of Technical Terms

Soil Description

The description of physical characteristics of soil deposit which may include (but is not limited to) density, color, texture, particle size distribution, moisture content, odor, and geological structure that is observed. Particle size distribution is generally described based on % weight particle size as determined by ASTM Method D423, using the following sizes and descriptors:

Soil Classification by Particle Diameter Size		Soil Classification by Particle Size Distribution % Weight	
Boulders	>200 mm	**Descriptor**	**% Particle Fraction**
Cobbles	60 mm - 200 mm	Noun - Sand	>35% and main fraction
Gravel	2.0 mm – 60 mm	"And" – And Sand	>35%
Sand	0.075 mm – 2.0 mm	Adjective - Sandy	20% - 35%
Fines (Silt & Clay Combined)	<0.075 mm	"Some" – Some Sand	10% - 20%
Silt	0.002 mm – 0.075 mm	"Traces of" – Traces of Sand	1% - 10%
Clay	<0.002 mm	Example: Silty *Sand with Some Clay and Traces of Gravel*	

Standard Penetration (SPT) Test

Compaction Condition or Relative Density is commonly estimated using a Standard Penetration Test (SPT test) during a borehole investigation. The procedure involves driving a 51 mm diameter open end split barrel sampler by dropping a free falling 63.5 kg weight a vertical distance of 760 mm, with each drop of the weight constituting a blow. The number of blows required to drive the sampler 300 mm after an initial penetration of 150 mm is referred to as the SPT N value. SPT Tests in exploratory borings give a qualitative guide to the in-situ engineering properties and provide a sample of the soil for observations of physical characteristics and laboratory analysis. The relative density and undrained shear strength can be estimated from the SPT N-Values obtained at a given depth as shown in the tables below for cohesionless and cohesive soils, respectively.

Compactness Condition / Relative Density of Cohesionless Soils via Standard Penetration Test

Compactness Condition / Relative Density	SPT N-Index
Very Loose	0 – 4
Loose	4 - 10
Compact	10 -30
Dense	30 - 50
Very Dense	>50

Consistency & Undrained Shear Strength (c_u) of Cohesive Soils

Consistency	Undrained Shear Strength (c_u)	SPT N-Index	Field Identification*
Very Soft	<12 kPa	<2	Easily penetrated several cm by fist
Soft	12 – 25 kPa	2 - 4	Easily penetrated several cm by thumb
Firm	25 – 50 kPa	4 – 8	Penetrated several cm by thumb with moderate effort
Stiff	50 – 100 kPa	8 – 15	Readily indented by thumb but penetrated with great effort
Very Stiff	100 – 200 kPa	15 – 30	Readily indented by the thumb nail
Hard	>200 kPa	>30	Indented with difficulty by thumbnail

*Field identification methods are tot suitable for the quantitative determination of soil strength as noted in the second column of this table.

Borehole & Test Pit Log Symbols Key
Descriptions & Glossary of Technical Terms

Test Pit Investigation

For small to mid sized structures which are to be supported by shallow foundations, a test pit investigation is often selected as an economical method of conducting a preliminary geotechnical field investigation. In this process, multiple test pits are excavated on a site using a backhoe or excavator. The physical characteristics of the in-situ soils can be documented, and samples of the materials can be collected for further observation and laboratory analysis. The presence and approximate depth of groundwater can also be determined during a test pit investigation if it is near the surface.

Dynamic Cone Penetrometer (DCP) Test

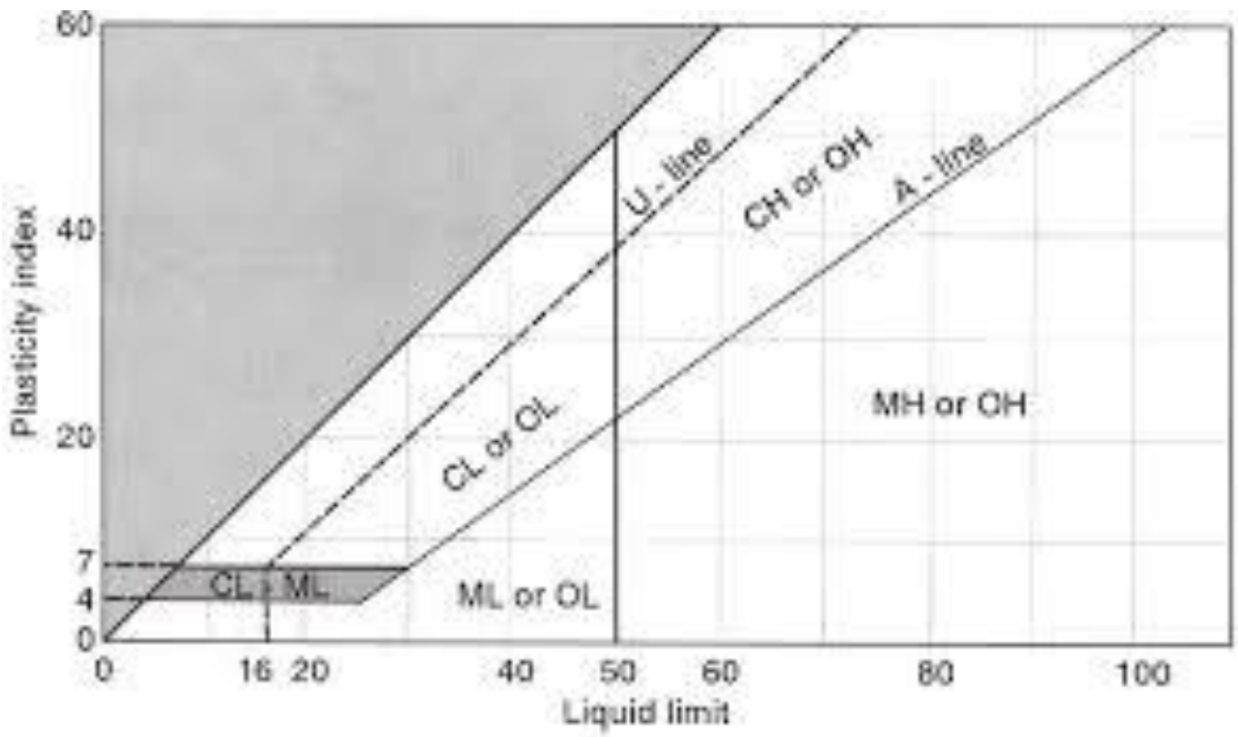
Dynamic Cone Penetration Tests involve driving a cone tipped probe of known geometry using a calibrated weight free falling a known distance. The number of blows required to drive the probe a given distance is recorded and the data is used to evaluate the strength of the soils. The test procedure is similar to a SPT Test; however, a soil sample cannot be retrieved due to the closed end tip on the probing device. The blow counts obtained from DCP tests are commonly used to determine an equivalent SPT N Value for a given soil or fill material present at depth.

Atterberg Limits

Atterberg Limits describe the range of water content or moisture content (w), called plasticity index $I_p – w_L – w_p$ over which a soil displays plastic behavior, where w_L and w_p are determined by ASTM Methods D423 & D424. The level of plasticity of a soil is defined as follows:

Low Degree of Plasticity	**$w_L < 30$**
Medium Degree of Plasticity	**$30 < w_L < 50$**
High Degree of Plasticity	**$50 < w_L$**

Atterberg limits can also be used to further determine soil texture and estimate particle size distribution and in cohesive and/or organic soils by plotting the plasticity index vs. the liquid limit as shown below.



Borehole & Test Pit Log Symbols Key
Descriptions & Glossary of Technical Terms

Bedrock Description & Evaluation

Bedrock is the lithified rock that is typically found below in-situ sediments and soil deposits that are commonly referred to as regolith or overburden materials. Bedrock can be characterized by its mineralogical and/or chemical composition, and the process under which it has formed as an igneous, metamorphic, or sedimentary deposit. Bedrock can be further described by its physical characteristics (color, strength, odor, etc.) and any distinct geological features (bedding planes, striations, joint spacing/orientation, fractures, vein deposits, etc.) that are visible in a specimen. Any signs of visible weathering are also important to note in a bedrock sample, as it can influence the bearing capacity and geotechnical design requirements, particularly in the uppermost extents of the deposit that may have been exposed directly to glacial loading and movement in the past. Common terminology used to describe weathering and strength are described below:

Terminology	Description / Typical Observation
Highly Weathered	Significant decomposition and discoloration of rock visible, easily broken by hand around edges, signs of clay deposits and/or chemical weathering in most or all joints
Moderately Weathered	Discoloration often visible, rock is notably weakened at upper surface and along joints, minor to moderate deposits and/or chemical weathering visible in most joints
Slightly Weathered	Slight discoloration may be visible, locally soft areas in rock when compared to fresh rock, minor discoloring along joints
Unweathered	No indication of discoloration or fluid movement along exposed surfaces of rock beds
Weak	Crumbles with blow of pick end of rock hammer
Moderately Weak	Crumbles with moderate blow of rock hammer
Moderately Strong	Will indent 5 mm with moderate to strong blow of pick end of rock hammer
Strong	Specimen can be broken with a single strong blow of rock hammer
Very Strong	Requires several strong blows with rock hammer to break specimen

Rock Quality Designation (RQD) is a measure of the degree of fractures in rock cores, defined as the ratio of the accumulated lengths (minimum 100 mm) of sound rock over the total core length. The table below includes the terminology that is used in the description of bedrock samples based on the measured RQD of a bedrock sample collected and analyzed in a geotechnical field instigation.

% RQD	Rock Quality Description
0% - 25%	Very Poor – Severely Fractured & Broken
25% - 50%	Poor – Regular Jointing Along Bedding Planes
50% - 75%	Fair – Blocky Structure with Some Bedding Planes Intact
75% - 90%	Good – Majority of Bedding Plans & Structures Intact
90% - 100%	Very Good – Little to No Jointing or Weathering

More detailed evaluation of bedrock strength and bearing capabilities can be completed using the Rock Mass Rating (RMR) system where the Uniaxial Compressive Strength, RQD, Spacing of Discontinuities, Condition of Discontinuities, Orientation of Discontinuities, and Groundwater Conditions are assessed to determine an RMR Value ranging from 0-100.

Rock Mass Rating	Rock Quality Description	Rock Mass Rating	Rock Quality Description
0 – 20	Very Poor	60 – 80	Good
20 – 40	Poor	80 - 100	Very Good
40 - 60	Fair		

Borehole & Test Pit Log Symbols Key
Descriptions & Glossary of Technical Terms

Symbols for Geotechnical Parameters of Soil & Bedrock ***As per the Canadian Foundation Engineering Manual 4th Edition (2006)***

Symbol	Term	Symbol	Term	Symbol	Term
Φ	Angle of Internal Friction	K_a	Active Earth Pressure Coefficient	ρ_{field}	Density Field Moisture Content
C_u	Undrained Shear Strength	K_p	Passive Earth Pressure Coefficient	ρ_{dry}	Dry Density
σ_c	Uniaxial Compressive Strength	K_o	Coefficient of Earth Pressure at Rest	ρ_{sat}	Saturated Density
σ_t	Tensile Strength	P_a	Active Earth Thrust	γ_{field}	Field Unit Weight
τ	Shear Stress	P_p	Passive Earth Thrust	γ'	Effective Unit Weight
ν	Poisson's Ratio	p_a	Active Earth Pressure	γ_{sat}	Saturated Unit Weight
e	Void Ratio	p_p	Passive Earth Pressure	k_s	Modulus of Subgrade Reaction
n	Porosity	w_L	Liquid Limit	I_P	Plasticity Index
w	Water/Moisture Content	w_P	Plastic Limit	I_L	Liquidity Index
k	Hydraulic Conductivity	w_S	Shrinkage Limit	I_C	Consistency Index
$\delta_{concrete}$	Interface Friction Angle Concrete	δ_{steel}	Interface Friction Angle Steel	δ_{wood}	Interface Friction Angle Wood

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Descriptions & Glossary of Technical Terms

Glossary of Technical Terms ***As per the Canadian Foundation Engineering Manual 4th Edition (2006)***

Soil – The portion of the earth's crust which is fragmented, or such that some individual particles of a dried sample can be readily separated by agitation in water, including boulders, cobbles, gravel, sand, silt, clay, and organic matter.

Poorly Graded Soil – A soil that has a predominance of particles of one size.

Well Graded Soil – A soil that has a wide range of sized particles.

Shape & Surface Conditions of Particles – Description of particle geometry (e.g., platy, elongated, equidimensional, angular, sub-angular, sub-rounded, rounded, etc.)

Rock – a natural aggregate of minerals that cannot readily be broken by hand.

Fill – Artificial (man-made or man-placed) deposits consisting of soil, rock, rubble, industrial wastes, organic materials, or any combination of these, which are transported and placed on the natural surface of soil or rock. Fills may or may not be compacted.

Groundwater – Free water in the ground.

Groundwater Level – The top surface of free water in the ground.

Perched Groundwater – Free water in the ground extending to a limited depth.

Artesian Groundwater – A confined body of water under a pressure that gives a level of hydrostatic pore pressure (phreatic elevation) that is higher than the top surface of the soil unit in which the pore water pressure exists. Flowing artesian corresponds to the condition where the phreatic elevation is higher than the ground surface.

Hydrostatic Pore Pressure – A pore water pressure varying as pressure in a non-moving free-standing column of water.

Frost Susceptible Soil – Soil in which significant ice segregation will occur resulting in frost heave, or heaving pressures, when requisite moisture and freezing conditions exist.

Frost Action – The phenomenon occurring when water in soil is subjected to freezing, which, because of the water-ice phase change or ice lens growth, results in a total volume increase, and/or the build-up of expansive forces under confined conditions, and the subsequent thawing that leads to the loss of sol strength and increased compressibility.

Adfreezing – The adhesion of soil to a foundation unit resulting from the freezing of soil water.

Allowable Bearing Pressure – In working stress design it is the maximum pressure that may be applied to a soil or rock by the foundation unit considered in design under expected loading and subsurface conditions towards achieving desired performance of the foundation system. In limit state design, allowable bearing pressure commonly corresponds to serviceability limit state for settlement not exceeding 25 mm towards achieving desired performance of the foundation.

Bearing Surface – The contact surface between a foundation unit and the soil or rock upon which it bears or is supported.

Geotechnical Resistance at Serviceability Limit State (SLS) – The reaction of the soil or rock at the deformation associated with a SLS condition.

Borehole & Test Pit Log Symbols Key
Descriptions & Glossary of Technical Terms

Geotechnical Resistance at Ultimate Limit State (ULS) – The geotechnical ultimate resistance of soil or rock corresponding to a failure mechanism (limit state) predictive from theoretical analysis using unfactored geotechnical parameters obtained from test or estimated from assessed values.

Factored Geotechnical Resistance at Ultimate Limit State (ULS) – The product of the geotechnical resistance factor and the geotechnical ultimate (nominal) soil or rock resistance.

Factored Geotechnical Bearing Resistance – The calculated ultimate (nominal) bearing resistance, obtained using characteristic ground parameters multiplied by the recommended geotechnical resistance factor.

Factor of Safety – In working stress design, the ratio of maximum available resistance to the resistance mobilized under the applied load.

Rock Quality Designation – A measure of the degree of fractures in rock cores, defined as the ratio of the accumulated lengths (minimum 100 mm) of sound rock over the total core length.

Foundation – A system or arrangement of structural members through which the loads from a building are transferred to supporting soil or rock.

Shallow Foundation – A foundation unit that provides support for a building by transferring loads to soil or rock located close to the lowest part of the building.

Deep Foundation – A foundation unit that provides support for a structure by transferring loads either by toe-bearing to soil or rock at considerable depth below the structure, or by shaft resistance in the soil or rock in which it is placed. Piles and caissons are the most common types of deep foundations.

Pile – A Slender deep foundation unit, made of materials such as wood, steel, or concrete, or combinations thereof, which is either premanufactured and placed by driving, jacking, jetting, or screwing, or cast-in-place in a hole formed by driving, excavating, or boring. Cast-in-place bored piles are commonly referred to as caissons in Canada.

Pier – A deep foundation unit with a large diameter to length ration, usually a large diameter bored pile or caisson.

Shaft Resistance – The resistance mobilized on the shaft side of a deep foundation. Upward acting is called positive shaft resistance. Downward acting is called negative shaft resistance or negative skin friction.

Downdrag – The transfer of load (dragload) to a deep foundation unit by means of negative skin friction when soil settles in relation to the foundation unit.

Overconsolidation Ratio (OCR) - The ration between the preconsolidation pressure and the current effective overburden stress.

Appendix IV

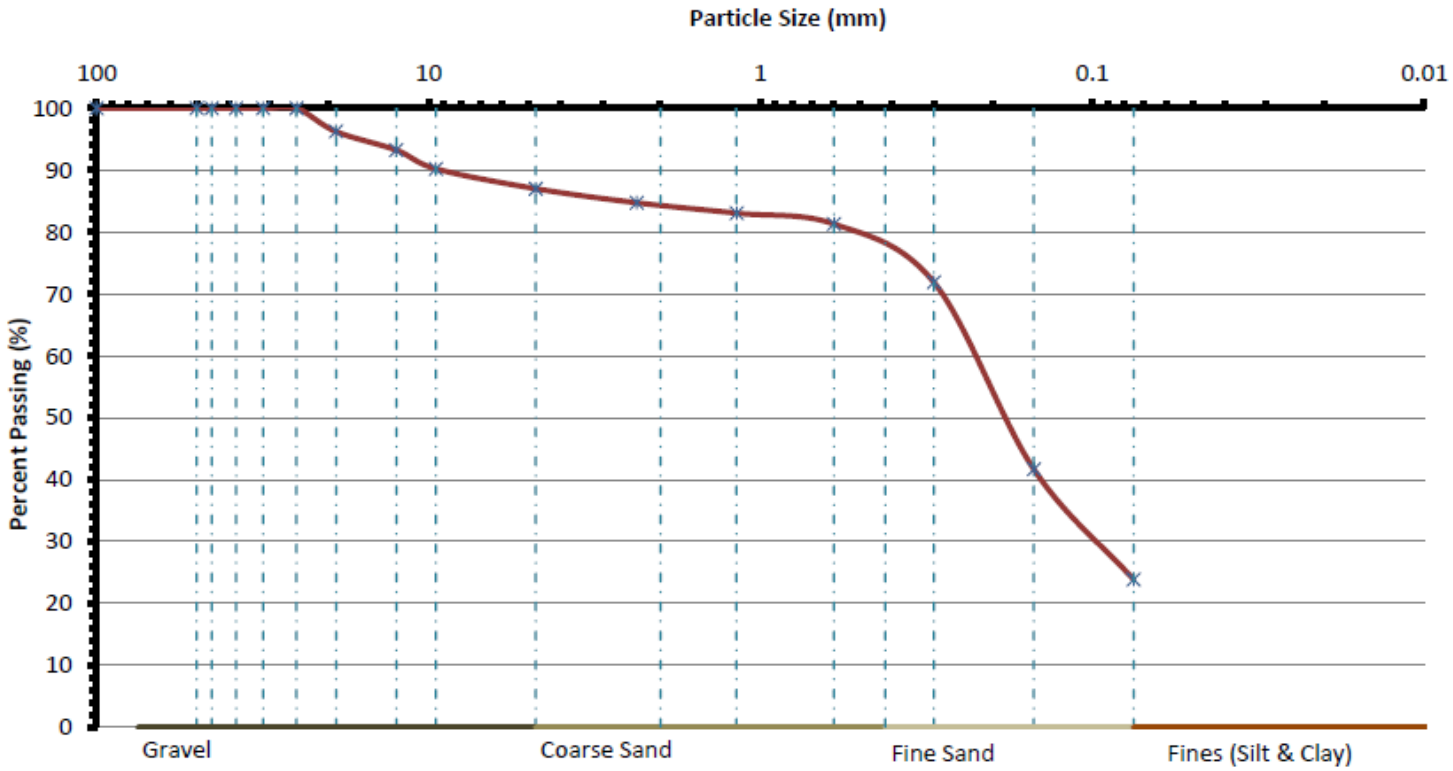
Laboratory Test Reports

ASTM C-136

ASTM C-117

Particle Size Analysis Report

EastTech Engineering Consultants	Project	Kings County Highway Depot Building Additions & Site Modifications	Project #	210832
	Client	PEI Department of Transportation and Infrastructure	Material	Glacial Till
	Location	Bridgetown, Prince Edward Island	Source	TP2 @ 1.0 m
	Contractor	Cardigan Excavators	Sample ID	SA #1
	Test Date	08-Sep-21	Sample Date	08-Sep-21



Partical Fraction	Sample Results	Sample Moisture Content
Gravel (4.75 mm - 300 mm)	13.0%	17.9%
Sand (0.075 mm - 4.75 mm)	63.2%	
Silt & Clay (< 0.075 mm)	23.9%	

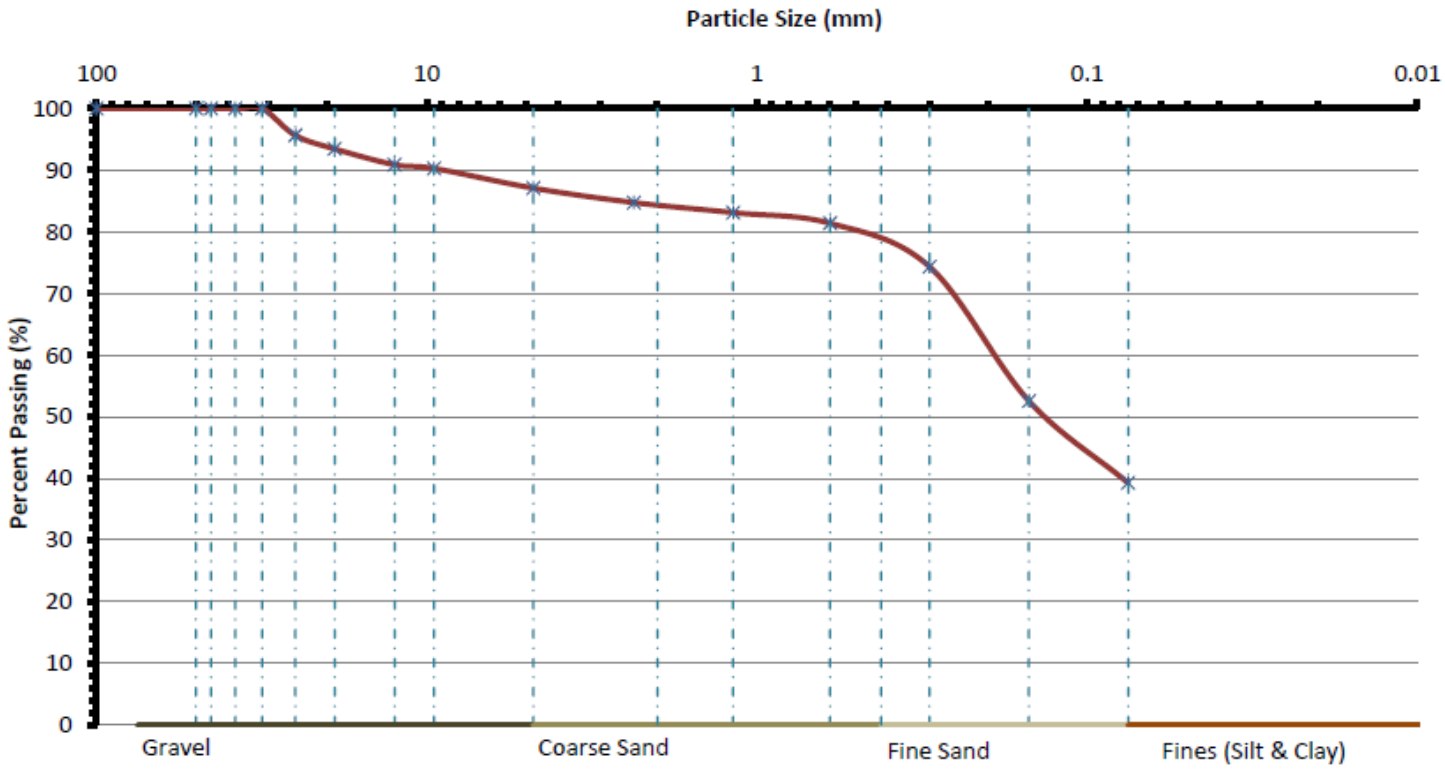
Comments

ASTM C-136

ASTM C-117

Particle Size Analysis Report

EastTech Engineering Consultants	Project	Kings County Highway Depot Building Additions & Site Modifications	Project #	210832
	Client	PEI Department of Transportation and Infrastructure	Material	Glacial Till
	Location	Bridgetown, Prince Edward Island	Source	TP4 @ 1.2 m - 2.1 m
	Contractor	Cardigan Excavators	Sample ID	SA #2
	Test Date	08-Sep-21	Sample Date	08-Sep-21



Partical Fraction	Sample Results	Sample Moisture Content
Gravel (4.75 mm - 300 mm)	12.9%	14.6%
Sand (0.075 mm - 4.75 mm)	47.8%	
Silt & Clay (< 0.075 mm)	39.3%	

Comments