



RETURN BIDS TO:

RETOURNER LES SOUMISSIONS À:

PWGSC/TPSGC Acquisitions

Sherwood Business Centre

161 St. Peters Road/

161, rue St. Peters

2nd Floor, Suite 204/

2ième étage, pièce 204

Charlottetown

Prince Edward Island

C1A 5P7

Bid Fax: (902) 566-7514

INVITATION TO TENDER

APPEL D'OFFRES

**Tender To: Public Works and Government Services
Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

Soumission aux: Travaux Publics et Services Gouvernementaux Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici et sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments - Commentaires

Vendor/Firm Name and Address

Raison sociale et adresse du

fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Public Works and Government Services Canada

Sherwood Business Centre

161 St. Peters Road/

2nd Floor, Suite 204

Charlottetown

Prince Ed

C1A 5P7

Title - Sujet Harmonic Filter Installation-JAG	
Solicitation No. - N° de l'invitation ED001-222125/A	Date 2022-02-15
Client Reference No. - N° de référence du client ED001-222125	GETS Ref. No. - N° de réf. de SEAG PW-\$PWC-035-4568
File No. - N° de dossier PWC-1-44017 (035)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM Atlantic Standard Time AST on - le 2022-03-08 Heure Normale de l'Atlantique HNA	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Beausoleil (PWC), Timothee	Buyer Id - Id de l'acheteur pwc035
Telephone No. - N° de téléphone (902) 388-8377 ()	FAX No. - N° de FAX (902) 566-7514
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: DEPARTMENT OF PUBLIC WORKS AND GOVERNMENT SERVICES CANADA REAL PROPERTY - PROJECT MANAGEMENT ST.PETERS RD SUITE 204 CHARLOTTETOWN Prince Edward Island C1A5P7 Canada	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée See Herein – Voir ci-inclus	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

**INVITATION TO TENDER
HARMONIC FILTER INSTALLATION
Jag Bldg, Summerside PE**

IMPORTANT NOTICE TO BIDDERS

Note to Bidders, there will no Public Opening for the purposes of this solicitation. See SI07 for further Instructions.

SI03 Optional Site Visit has changed

SI11 Security Clearance Requirements has changed

SI12 COVID-19 Vaccination Requirement and Certification has been added

SC04 Compliance with on-site measures, standing orders, policies, and rules has been added

APPENDIX 4 - COVID-19 Vaccination Requirement Certification has been added

THIS DOCUMENT CONTAINS A SECURITY CLEARANCE REQUIREMENT

For further instructions please consult "Special Instruction to Bidders", SI11, "Security Clearance Requirements" and "Supplementary Conditions" SC01 "Security Clearance Requirements, Document Safeguarding Location".

LISTING OF SUBCONTRACTORS AND SUPPLIERS

Take note that R2710T, GI07 "Listing of Subcontractors and Suppliers" has been amended. See SI10 of the Special Instructions. **Failure to do so will result in the disqualification of its bid.**

TABLE OF CONTENTS

SPECIAL INSTRUCTIONS TO BIDDERS (SI)	4
SI01 BID DOCUMENTS	4
SI02 ENQUIRIES DURING THE SOLICITATION PERIOD	4
SI03 OPTIONAL SITE VISIT	4
SI04 REVISION OF BID	4
SI05 BID SECURITY REQUIREMENTS	5
SI06 SUBMISSION OF BID	5
SI07 BID RESULTS	6
SI08 INSUFFICIENT FUNDING	7
SI09 BID VALIDITY PERIOD	7
SI10 RIGHTS OF CANADA	7
SI11 SECURITY CLEARANCE REQUIREMENTS	7
SI12 COVID-19 VACCINATION REQUIREMENT AND CERTIFICATION	8
SI13 LISTING OF SUBCONTRACTORS AND SUPPLIERS	8
SI14 BID CHALLENGE AND RECOURSE MECHANISMS	8
SI15 CONSTRUCTION DOCUMENTS	8
SI16 WEB SITES	9
R2710T GENERAL INSTRUCTIONS - CONSTRUCTION SERVICES - BID SECURITY REQUIREMENTS (GI) (2021-04-01)	10
CONTRACT DOCUMENTS (CD)	11
SUPPLEMENTARY CONDITIONS (SC)	12
SC01 SECURITY CLEARANCE REQUIREMENTS	12
SC02 LIMITATION OF LIABILITY	12
SC03 INSURANCE TERMS	13
SC04 COMPLIANCE WITH ON-SITE MEASURES, STANDING ORDERS, POLICIES, AND RULES	13
SC05 TYPES AND AMOUNTS OF CONTRACT SECURITY	14
BID AND ACCEPTANCE FORM (BA)	15
BA01 IDENTIFICATION	15
BA02 LEGAL NAME AND ADDRESS OF BIDDER	15
BA03 THE OFFER	15
BA04 BID VALIDITY PERIOD	15
BA05 ACCEPTANCE AND CONTRACT	15
BA06 CONSTRUCTION TIME	15
BA07 BID SECURITY	15
BA08 SIGNATURE	15
APPENDIX 1 – INTEGRITY PROVISIONS	16
APPENDIX 2 - LISTING OF SUBCONTRACTORS AND SUPPLIERS	17
APPENDIX 3 - VOLUNTARY CERTIFICATION TO SUPPORT THE USE OF APPRENTICES	18

APPENDIX 4 - COVID-19 VACCINATION REQUIREMENT CERTIFICATION	20
ANNEX A - SECURITY REQUIREMENT CHECK LIST (SRCL).....	21
ANNEX B - CERTIFICATE OF INSURANCE	22
ANNEX C - VOLUNTARY REPORT FOR APPRENTICES EMPLOYED DURING THE CONTRACT.....	24
ANNEX D – SPECIFICATIONS AND DRAWINGS / SCOPE OF WORK.....	25

SPECIAL INSTRUCTIONS TO BIDDERS (SI)

SI01 BID DOCUMENTS

1. The following are the Bid Documents:

- a. Invitation to Tender - Page 1;
- b. Special Instructions to Bidders;
- c. General Instructions - Construction Services - Bid Security Requirements R2710T (2021-04-01)
- d. Clauses & Conditions identified in "Contract Documents";
- e. Drawings and Specifications;
- f. Bid and Acceptance Form and related Appendix(s); and
- g. Any amendment issued prior to solicitation closing.

Submission of a bid constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

2. General Instructions - Construction Services - Bid Security Requirements R2710T is incorporated by reference and is set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site: <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

SI02 ENQUIRIES DURING THE SOLICITATION PERIOD

1. Enquiries regarding this bid must be submitted in writing to the Contracting Authority named on the Invitation to Tender - Page 1 timothee.beausoleil2@pwgsc-tpsgc.gc.ca. Except for the approval of alternative materials as described in GI15 of R2710T, enquiries should be received no later than 5 business days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may result in an answer NOT being provided.
2. To ensure consistency and quality of the information provided to Bidders, PWGSC will examine the content of the enquiry and will decide whether to issue an amendment.
3. All enquiries and other communications related to this bid sent throughout the solicitation period must be directed ONLY to the Contracting Authority named in paragraph 1. above--Failure to comply with this requirement may result in the bid being declared non-compliant.

SI03 OPTIONAL SITE VISIT

1. There will be a virtual site visit on Monday February 28, 2022 at 11:00am AST. Interested bidders will participate in a virtual Zoom/MSTeams meeting.
2. The virtual site visit for this project is OPTIONAL. Contractors interested in participating in the virtual site visit are **required to register** with the Contracting Authority in advance by e-mail at timothee.beausoleil2@pwgsc-tpsgc.gc.ca by no later than 12:00pm AST on February 24, 2022. The Contracting Authority will provide a link for the virtual visit.

SI04 REVISION OF BID

A bid may be revised by letter, epost Connect or facsimile in accordance with GI10 of R2710T. The facsimile number for receipt of revisions is 902-566-7514.

SI05 BID SECURITY REQUIREMENTS

R2710T - General Instructions - Construction Services - Bid Security Requirements is modified as follow:

Delete GI08.2 and replace with the following:

2. A bid bond (form PWGSC-TPSGC 504) shall be in an approved form, properly completed, with valid and enforceable signatures and sealed by the approved bonding company whose bonds are acceptable to Canada either at the time of solicitation closing or as identified in Treasury Board Appendix L, Acceptable Bonding Companies.
- 2.1 A bid bond may be submitted in an electronic format (Electronic Bonding (E-Bond)) if it meets the following criteria:
 - a. The version submitted by the Bidder must be an electronic encrypted file with embedded digital certificate verifiable by Canada with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company.
 - b. The version submitted must be viewable, printable and storable in standard electronic file formats compatible with Canada, and in a single file, allowable format pdf.
 - c. The verification may be conducted by Canada immediately or at any time during the life of the Bond and at the discretion of Canada.
 - d. The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 2.1.a.
 - e. Submitting copies (**non-original, non-verifiable or scanned copy**) of signed and sealed bid bond are not acceptable. Failure to submit an original or verifiable bond will render the bid non-compliant. Non-compliant bids will be given no further consideration. **A scanned copy of a bond does not constitute a digital bond.**
- 2.2 Bonds failing the verification process will NOT be considered valid.
- 2.3 Bonds passing the verification process will be treated as original and authentic.

SI06 SUBMISSION OF BID

R2710T GI09 Submission of bid is modified as follows

Add subparagraph 5 - Electronic Bid Submission by epost Connect service

- a. Unless specified otherwise in the bid solicitation, bids may be submitted by using the [epost Connect service](#) provided by Canada Post Corporation.
- b. The only acceptable email address to use with epost Connect for responses to bid solicitations issued by PWGSC is:

Atlantic(N.B/PEI): TPSGC.RARceptionSoumisNBPE-ARBidReceivingNBPE.PWGSC@tpsgc-pwgsc.gc.ca

Note: Bids emailed directly to this email address will be rejected and deemed non-compliant. This email address is to be used to open an epost Connect conversation, as detailed in c., or to send proposals through an epost Connect message if the Bidder is using its own licensing agreement for epost Connect.

- c. To submit a bid using epost Connect service, the Bidder must either:
 - i. send directly its bid only to the specified PWGSC Bid Receiving Unit, using its own licensing agreement for epost Connect provided by Canada Post Corporation; or

- ii. send as early as possible, and in any case, at least six business days prior to the solicitation closing date and time, (in order to ensure a response), an email that includes the bid solicitation number to the specified PWGSC Bid Receiving Unit requesting to open an epost Connect conversation. Requests to open an epost Connect conversation received after that time may not be answered.
- d. If the Bidder sends an email requesting epost Connect service to the specified Bid Receiving Unit in the bid solicitation, an officer of the Bid Receiving Unit will then initiate an epost Connect conversation. The epost Connect conversation will create an email notification from Canada Post Corporation prompting the Bidder to access and action the message within the conversation. The Bidder will then be able to transmit its bid afterward at any time prior to the solicitation closing date and time.
- e. If the Bidder is using its own licensing agreement to send its bid, the Bidder must keep the epost Connect conversation open until at least thirty (30) business days after the solicitation closing date and time.
- f. The bid solicitation number should be identified in the epost Connect message field of all electronic transfers.
- g. It should be noted that the use of epost Connect service requires a Canadian mailing address. Should a bidder not have a Canadian mailing address, they may use the Bid Receiving Unit address specified in the solicitation in order to register for the epost Connect service.
- h. For bids transmitted by epost Connect service, Canada will not be responsible for any failure attributable to the transmission or receipt of the bid including, but not limited to, the following:
 - i. receipt of a garbled, corrupted or incomplete bid;
 - ii. availability or condition of the epost Connect service;
 - iii. incompatibility between the sending and receiving equipment;
 - iv. delay in transmission or receipt of the bid;
 - v. failure of the Bidder to properly identify the bid;
 - vi. illegibility of the bid;
 - vii. security of bid data; or,
 - viii. inability to create an electronic conversation through the epost Connect service.
- i. The Bid Receiving Unit will send an acknowledgement of the receipt of bid document(s) via the epost Connect conversation, regardless of whether the conversation was initiated by the supplier using its own license or the Bid Receiving Unit. This acknowledgement will confirm only the receipt of bid document(s) and will not confirm if the attachments may be opened nor if the content is readable.
- j. Bidders must ensure that they are using the correct email address for the Bid Receiving Unit when initiating a conversation in epost Connect or communicating with the Bid Receiving Unit and should not rely on the accuracy of copying and pasting the email address into the epost Connect system.
- k. A bid transmitted by epost Connect service constitutes the formal bid of the Bidder.

SI07 BID RESULTS

1. There will be no Public Opening for the purposes of this solicitation.
2. The responsive bid carrying the lowest price will be recommended for contract award.
3. Following solicitation closing, bid results may be obtained by e-mailing a request to:
timothee.beausoleil2@pwgsc-tps.gc.ca

SI08 INSUFFICIENT FUNDING

In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may

- a. cancel the solicitation; or
- b. obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid.

SI09 BID VALIDITY PERIOD

1. Canada reserves the right to seek an extension to the bid validity period prescribed in BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders will have the option to either accept or reject the proposed extension.
2. If the extension referred to in paragraph 1. above is accepted, in writing, by all those who submitted bids, then Canada will continue immediately with the evaluation of the bids and its approvals processes.
3. If the extension referred to in paragraph 1. above is not accepted in writing by all those who submitted bids then Canada will, at its sole discretion, either
 - a. continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or
 - b. cancel the invitation to tender.
4. The provisions expressed herein do not in any manner limit Canada's rights in law or under GI11 of R2710T.

SI10 RIGHTS OF CANADA

1. Canada reserves the right to:
 - a. Reject any or all bids received in response to the bid solicitation;
 - b. Enter into negotiations with bidders on any or all aspects of their bids;
 - c. Accept any bid in whole or in part without negotiations;
 - d. Cancel the bid solicitation at any time;
 - e. Reissue the bid solicitation;
 - f. If no compliant bids are received and the requirement is not substantially modified, reissue the bid solicitation by inviting only the bidders who bid to resubmit bids within a period designated by Canada; and
 - g. Negotiate with the sole compliant Bidder to ensure best value to Canada.

SI11 SECURITY CLEARANCE REQUIREMENTS

1. **Before award of a contract, the Bidder must hold a valid Security Clearance** as indicated in section SC01 of the Supplementary Conditions.
2. The successful Bidder's personnel, as well as any subcontractor and its personnel, who are required to perform any part of the Work pursuant to the subsequent contract must meet the mandatory security requirement as indicated in section SC01 of the Supplementary Conditions. **Individuals who do not have the required level of security will not be allowed on site.** It is the responsibility of the successful Bidder to ensure that the security requirements are met throughout the performance of the contract. Canada will not be held liable or accountable for any delays or additional costs associated with the successful Bidder's non-compliance with the mandatory security requirement.
3. Bidders are reminded to obtain the required security clearance promptly. Any delay in the award of a contract to allow the successful Bidder to obtain the required clearance will be at the entire discretion of the Contracting Authority.

4. For additional information on security requirements, bidders should refer to the Contract Security Program of Public Works and Government Services Canada (<http://www.tpsgc-pwgsc.gc.ca/esc-src/introduction-eng.html>) website.

SI12 COVID-19 VACCINATION REQUIREMENT AND CERTIFICATION

This requirement is subject to the COVID-19 Vaccination Policy for Supplier Personnel. All Bidders must provide with their bid, the COVID-19 Vaccination Requirement Certification attached to this bid solicitation (Appendix 4).

This Certification incorporated into the bid solicitation on its closing date is incorporated into, and forms a binding part of any resulting Contract. Failure to complete and provide the COVID-19 Vaccination Requirement Certification as part of the bid will render the bid non-responsive.

SI13 LISTING OF SUBCONTRACTORS AND SUPPLIERS

R2710T, GI07 has been amended to the following.

GI07 (2015-02-25) Listing of Subcontractors and Suppliers

The Bidder must submit the names of Subcontractors and Suppliers for the part or parts of the Work listed. See APPENDIX 2. **Failure to do so will result in the disqualification of its bid.**

SI14 BID CHALLENGE AND RECOURSE MECHANISMS

- (a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.
- (b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's [Buy and Sell](#) website, under the heading "[Bid Challenge and Recourse Mechanisms](#)" contains information on potential complaint bodies such as:
- Office of the Procurement Ombudsman (OPO)
 - Canadian International Trade Tribunal (CITT)
- (c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.

SI15 CONSTRUCTION DOCUMENTS

The successful Contractor will be provided (**with 1 electronic or paper copy**) of the sealed and signed drawings, the specifications and the amendments upon acceptance of the offer.

SI16 WEB SITES

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Treasury Board Appendix L, Acceptable Bonding Companies
<http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494§ion=text#appl>

Buy and Sell
<https://www.achatsetventes-buyandsell.gc.ca>

Canadian economic sanctions
<http://www.international.gc.ca/sanctions/index.aspx?lang=eng>

Contractor Performance Evaluation Report (Form PWGSC-TPSGC 2913)
<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913.pdf>

Bid Bond (form PWGSC-TPSGC 504)
<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/504.pdf>

Performance Bond (form PWGSC-TPSGC 505)
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/505_eng.pdf

Labour and Material Payment Bond (form PWGWS-TPSGC 506)
<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/506.pdf>

Standard Acquisition Clauses and Conditions (SACC) Manual
<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

PWGSC, Contract Security Program
<http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html>

PWGSC, Code of Conduct and Certifications
<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/contexte-context-eng.html>

Construction and Consultant Services Contract Administration Forms Real Property Contracting
<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>

Declaration Form
<http://www.tpsgc-pwgsc.gc.ca/ci-if/formulaire-form-eng.html>

Trade agreements
<https://buyandsell.gc.ca/policy-and-guidelines/Policy-and-Legal-Framework/Trade-Agreements>

R2710T GENERAL INSTRUCTIONS - CONSTRUCTION SERVICES - BID SECURITY REQUIREMENTS (GI) (2021-04-01)

The following GI's are included by reference and are available at the following Web Site

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2710T/23>

- GI01 Integrity Provisions - Bid
- GI02 Completion of Bid
- GI03 Identity or Legal Capacity of the Bidder
- GI04 Applicable Taxes
- GI05 Capital Development and Redevelopment Charges
- GI06 Registry and Pre-qualification of Floating Plant
- GI07 Listing of Subcontractors and Suppliers
- GI08 Bid Security Requirements
- GI09 Submission of Bid
- GI10 Revision of Bid
- GI11 Rejection of Bid
- GI12 Bid Costs
- GI13 Procurement Business Number
- GI14 Compliance with Applicable Laws

- GI15 Approval of Alternative Materials
- GI16 Performance Evaluation
- GI17 Conflict of Interest-Unfair Advantage
- GI18 Code of Conduct for Procurement—bid

CONTRACT DOCUMENTS (CD)

1. The following are the Contract Documents:
 - a. Contract Page when signed by Canada;
 - b. Duly completed Bid and Acceptance Form and any Appendices attached thereto;
 - c. Drawings and Specifications;
 - d. General Conditions and clauses

GC1	General Provisions – Construction Services	R2810D	(2017-11-28);
GC2	Administration of the Contract	R2820D	(2016-01-28);
GC3	Execution and Control of the Work	R2830D	(2019-11-28);
GC4	Protective Measures	R2840D	(2008-05-12);
GC5	Terms of Payment	R2850D	(2019-11-28);
GC6	Delays and Changes in the Work	R2860D	(2019-05-30);
GC7	Default, Suspension or Termination of Contract	R2870D	(2018-06-21);
GC8	Dispute Resolution	R2880D	(2019-11-28);
GC9	Contract Security	R2890D	(2018-06-21);
GC10	Insurance	R2900D	(2008-05-12);
	Allowable Costs for Contract Changes Under GC6.4.1	R2950D	(2015-02-25);
 - e. Supplementary Conditions
 - f. Any amendment issued or any allowable bid revision received before the date and time set for solicitation closing;
 - g. Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
 - h. Any amendment or variation of the contract documents that is made in accordance with the General Conditions.
2. The documents identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site:
<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>
3. The language of the contract documents is the language of the Bid and Acceptance Form submitted.

SUPPLEMENTARY CONDITIONS (SC)

SC01 SECURITY CLEARANCE REQUIREMENTS

SECURITY REQUIREMENT FOR CANADIAN SUPPLIER: PWGSC FILE No. R-116327-001

1. The Contractor/Offeror must, at all times during the performance of the Contract/Standing Offer, hold a valid Designated Organization Screening (DOS), issued by the Contract Security Program (CSP), Public Works and Government Services Canada (PWGSC).
2. The Contractor/Offeror personnel requiring access to sensitive site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by the CSP, PWGSC.
3. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of the CSP, PWGSC.
4. The Contractor/Offeror must comply with the provisions of the:
 - a) Security Requirements Check List and security guide (if applicable), attached at Annex A;
 - b) *Contract Security Manual* (Latest Edition).

SC02 LIMITATION OF LIABILITY

GC1.6 of R2810D is deleted and replaced with the following:

GC1.6 Indemnification by the Contractor

1. The Contractor shall indemnify and save Canada harmless from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by Canada or in respect of claims by any third party, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by, or attributable to the activities of the Contractor in performing the Work, provided such claims are caused by the negligent or deliberate acts or omissions of the Contractor, or those for whom it is responsible at law.

The Contractor's obligation to indemnify Canada for losses related to first party liability shall be limited to:

- a. In respect to each loss for which insurance is to be provided pursuant to the insurance requirements of the Contract, the Commercial General Liability insurance limit for one occurrence as referred to in the insurance requirements of the Contract .
 - b. In respect to losses for which insurance is not required to be provided in accordance with the insurance requirements of the Contract, the greater of the Contract Amount or \$5,000,000, but in no event shall the sum be greater than \$20,000,000.
2. The limitation of this obligation shall be exclusive of interest and all legal costs and shall not apply to any infringement of intellectual property rights or any breach of warranty obligations.
3. The Contractor's obligation to indemnify Canada for losses related to third party liability shall have no limitation and shall include the complete costs of defending any legal action by a third party. If requested by Canada, the Contractor shall defend Canada against any third party claims.
4. The Contractor shall pay all royalties and patent fees required for the performance of the Contract and, at the Contractor's expense, shall defend all claims, actions or proceedings against Canada charging or claiming that the Work or any part thereof provided or furnished by the Contractor to Canada infringes any patent, industrial design, copyright trademark, trade secret or other proprietary right enforceable in Canada.

5. Notice in writing of a claim shall be given within a reasonable time after the facts, upon which such claim is based, became known.

SC03 INSURANCE TERMS

1) Insurance Contracts

- (a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.
- (b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

2) Period of Insurance

- (a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.
- (b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.

3) Proof of Insurance

- (a) Before commencement of the Work, and no later than thirty (30) days after contract award, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein.
- (b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.

4) Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

5) Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.

SC04 COMPLIANCE WITH ON-SITE MEASURES, STANDING ORDERS, POLICIES, AND RULES

The Contractor must comply and ensure that its employees and subcontractors comply with all security measures, standing orders, policies or other rules in force at the site where the Work is performed.

SC05 TYPES AND AMOUNTS OF CONTRACT SECURITY

Remove and Replace GC9.2.2. with the following

A performance bond (form PWGSC-TPSGC 505) and a labour and material payment bond (form PWGSC-TPSGC 506) referred to in subparagraph 1)(a) of GC9.2 shall be in a form and be issued by a bonding or surety company (see Treasury Board Appendix L, Acceptable Bonding Companies) that is approved by Canada. They can be in the form of Signed and Sealed paper version OR electronic digital version.

Electronic digital versions must meet the following;

1. A performance bond and a labour and material payment bond may be submitted in an electronic or digital format if it meets the following criteria:
 - 1.1. The versions submitted by the Contractor must be verifiable by Canada with respect to the totality and wholeness of the bonds form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company.
 - 1.2. The versions submitted must be viewable, printable and storable in standard electronic file formats compatible with Canada, and in a single file. Allowable formats include pdf.
 - 1.3. The verification may be conducted by Canada immediately or at any time during the life of the bonds and at the discretion of Canada with no requirement for passwords or fees.
 - 1.4. The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 1.1.
2. Bonds failing the verification process will NOT be considered to be valid.

BID AND ACCEPTANCE FORM (BA)

BA01 IDENTIFICATION

HARMONIC Filter Installation – JAG Bldg, Summerside PE

BA02 LEGAL NAME AND ADDRESS OF BIDDER

Legal Name:					
Operating Name (if any):					
Address:					
Telephone:		Fax:		PBN:	
E-mail address:					
Contract Security Program Organisation Number (when required)					

BA03 THE OFFER

The Bidder offers to Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the Total Bid Amount of

\$ _____ excluding Applicable Tax(s).
(amount in numbers)

BA04 BID VALIDITY PERIOD

The bid must not be withdrawn for a period of 30 days following the date of solicitation closing.

BA05 ACCEPTANCE AND CONTRACT

Upon acceptance of the Bidder's offer by Canada, a binding Contract will be formed between Canada and the Bidder. The documents forming the Contract will be the Contract Documents identified in "Contract Documents (CD)" section.

BA06 CONSTRUCTION TIME

The Contractor must perform and complete the Work within 18 weeks from the date of notification of acceptance of the offer.

BA07 BID SECURITY

The Bidder must enclose bid security with its bid in accordance with GI08 - Bid Security Requirements of R2710T - General Instructions - Construction Services - Bid Security Requirements.

BA08 SIGNATURE

--

Name and title of person authorized to sign on behalf of Bidder (Type or print)

--

Signature

--

Date

APPENDIX 1 – INTEGRITY PROVISIONS

(Text copied from the Ineligibility and Suspension Policy <http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html> dated 2016-04-04)

List of names: All Bidders, regardless of their status under the Policy, must submit the following information when participating in a procurement process or real property transaction:

- Bidders that are corporate entities, including those bidding as joint ventures, must provide a complete list of the names of all current directors or, for a privately owned corporation, the names of the owners of the corporation;
- Bidders Bidding as sole proprietors, including sole proprietors bidding as joint ventures, must provide a complete list of the names of all owners; or
- Bidders that are a partnership do not need to provide a list of names.

If the list of names has not been received in a procurement process or real property transaction by the time the evaluation of Bids or Offers is completed, or has not been received in a procurement process or real property transaction where no Bid/Offer will be submitted, the Contracting Authority will inform the Bidder of a time within which to provide the information. Providing the required names is a mandatory requirement for award of a contract or real property agreement. Failure to provide the list of names within the time specified will render a Bid or Offer non-responsive, or the Bidder otherwise disqualified for award of a contract or real property agreement.

APPENDIX 2 - LISTING OF SUBCONTRACTORS AND SUPPLIERS

The Bidder must submit the list of Subcontractors and Suppliers for any division of the Work as listed in the table below. If "own forces" of the General Contractor are planned to be used to execute certain division(s) of work it must also be indicated in the table below.

	Subcontractor and Suppliers	Division
1		26 - Electrical
2		26- Electrical

APPENDIX 3 - VOLUNTARY CERTIFICATION TO SUPPORT THE USE OF APPRENTICES (page 1 of 2)

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA APPRENTICE PROCUREMENT INITIATIVE

1. To encourage employers to participate in apprenticeship training, Bidders, bidding on construction and maintenance contracts by Public Works and Government Services Canada (PWGSC) are being asked to sign a voluntary certification, signaling their commitment to hire and train apprentices.
2. Canada is facing skills shortages across various sectors and regions, especially in the skilled trades. Equipping Canadians with skills and training is a shared responsibility. The Government of Canada made a commitment to support the use of apprentices in federal construction and maintenance contracts. Contractors have an important role in supporting apprentices through hiring and training and are encouraged to certify that they are providing opportunities to apprentices as part of doing business with the Government of Canada.
3. The Government of Canada is encouraging apprenticeships and careers in the skilled trades. In addition, the government offers a tax credit to employers to encourage them to hire apprentices. Information on this tax measure administered by the Canada Revenue Agency can be found at: www.cra-arc.gc.ca. Employers are also encouraged to find out what additional information and supports are available from their respective provincial or territorial jurisdiction.
4. Signed certifications on page 2 of 2 will be used to better understand contractor use of apprentices on Government of Canada maintenance and construction contracts and may inform future policy and program development.
5. The Contractor hereby certifies the following:

In order to help meet demand for skilled trades people, the Contractor agrees to use, and require its subcontractors to use, reasonable commercial efforts to hire and train registered apprentices, to strive to fully utilize allowable apprenticeship ratios * and to respect any hiring requirements prescribed by provincial or territorial statutes

The Contractor hereby consents to this information being collected and held by PWGSC, and Employment and Social Development Canada to support work to gather data on the hiring and training of apprentices in federal construction and maintenance contracts.

To support this initiative, a voluntary certification signaling the Contractor's commitment to hire and train apprentices is available at page 2 of 2.

If you accept fill out and sign page 2 of 2.

** The journeyperson-apprentice ratio is defined as the number of qualified/certified journeypersons that an employer must employ in a designated trade or occupation in order to be eligible to register an apprentice as determined by provincial/territorial (P/T) legislation, regulation, policy directive or by law issued by the responsible authority or agency.*

VOLUNTARY CERTIFICATION

(To be filled out and returned with bid on a voluntary basis)

(page 2 of 2)

Note: The contractor will be asked to fill out a report every six months or at project completion as per sample "Voluntary Reports for Apprentices Employed during the Contract" provided at Annex C

Name:	
Signature:	
Company Name:	
Company Legal Name:	
Solicitation Number:	
Number of company employees:	
Number of apprentices planned to be working on this contract:	

Trades of those apprentices:

APPENDIX 4 - COVID-19 VACCINATION REQUIREMENT CERTIFICATION

I, _____ (first and last name), as the representative of
_____ (name of business) pursuant to
_____ (insert solicitation number), warrant and certify that all personnel that
_____ (name of business) will provide on this Contract who access federal
government workplaces within Canada where they may come into contact with public servants will be:

(a) fully vaccinated against COVID-19;

(b) for personnel that are unable to be vaccinated due to a certified medical contraindication, religion or other prohibited grounds of discrimination under the *Canadian Human Rights Act*, subject to accommodation and mitigation measures that have been presented to and approved by Canada; or

(c) partially vaccinated against COVID-19 for a period of up to 10 weeks from the date of their first dose and subject to temporary measures that have been presented to and approved by Canada, immediately after which period the personnel will meet the conditions of (a) or (b) or will no longer access federal government workplaces where they may come into contact with public servants under this Contract;

until such time that Canada indicates that the mandatory vaccination requirements of the Mandatory Vaccination Policy for Supplier Personnel are no longer in effect.

I certify that all personnel provided by _____ (name of business) have been notified of the vaccination requirements of the Government of Canada's COVID-19 Vaccination Policy for Supplier Personnel, and that the _____ (name of business) has certified to their compliance with this requirement.

I certify that the information provided is true as of the date indicated below and will continue to be true for the duration of the Contract. I understand that the certifications provided to Canada are subject to verification at all times. I also understand that Canada will declare a contractor in default, if a certification is found to be untrue, whether made knowingly or unknowingly, during the bid or contract period. Canada reserves the right to ask for additional information to verify the certifications. Failure to comply with any request or requirement imposed by Canada will constitute a default under the Contract.

Signature: _____

Date: _____

Optional

For data purposes only, initial below if your business already has its own mandatory vaccination policy or requirements for employees in place. Initialing below is not a substitute for completing the mandatory certification above.

Initials: _____

Information you provide on this Certification Form and in accordance with the Government of Canada's COVID-19 Vaccination Policy for Supplier Personnel will be protected, used, stored and disclosed in accordance with the Privacy Act. Please note that you have a right to access and correct any information on your file, and you have a right to file a complaint with the Office of the Privacy Commissioner regarding the handling of your personal information. These rights also apply to all individuals who are deemed to be personnel for the purpose for the Contract and who require access to federal government workplaces where they may come into contact with public servants.

Solicitation No. - N° de l'invitation
ED001-222125

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur
PWC035

Client Ref. No. - N° de réf. du client
R.116327.001

File No. - N° du dossier
PWC-1-44017

CCC No./N° CCC - FMS No./N° VME

ANNEX A - SECURITY REQUIREMENT CHECK LIST (SRCL)



SECURITY REQUIREMENTS CHECK LIST (SRCL)

LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine		Public Works and Government Services Canada	2. Branch or Directorate / Direction générale ou Direction PTS	
3. a) Subcontract Number / Numéro du contrat de sous-traitance			3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant	
4. Brief Description of Work / Brève description du travail In general, work under this contract consists of the supply of all material, labour and plant associated with the installation, connection and commissioning of two (2) new 600V, 3Ø free standing active harmonic mitigating filters.				
5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?			<input checked="" type="checkbox"/> No Non	<input type="checkbox"/> Yes Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?			<input checked="" type="checkbox"/> No Non	<input type="checkbox"/> Yes Oui
6. Indicate the type of access required / Indiquer le type d'accès requis				
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)			<input checked="" type="checkbox"/> No Non	<input type="checkbox"/> Yes Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.			<input type="checkbox"/> No Non	<input checked="" type="checkbox"/> Yes Oui
6. c) Is this a commercial courier or delivery requirement with no overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?			<input checked="" type="checkbox"/> No Non	<input type="checkbox"/> Yes Oui
7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès				
Canada <input type="checkbox"/>		NATO / OTAN <input type="checkbox"/>		Foreign / Étranger <input type="checkbox"/>
7. b) Release restrictions / Restrictions relatives à la diffusion				
No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>		All NATO countries Tous les pays de l'OTAN <input type="checkbox"/>		No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>
Not releasable À ne pas diffuser <input type="checkbox"/>				
Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :		Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :		Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :
7. c) Level of information / Niveau d'information				
PROTECTED A PROTÉGÉ A <input type="checkbox"/>		NATO UNCLASSIFIED NATO NON CLASSIFIÉ <input type="checkbox"/>		PROTECTED A PROTÉGÉ A <input type="checkbox"/>
PROTECTED B PROTÉGÉ B <input type="checkbox"/>		NATO RESTRICTED NATO DIFFUSION RESTREINTE <input type="checkbox"/>		PROTECTED B PROTÉGÉ B <input type="checkbox"/>
PROTECTED C PROTÉGÉ C <input type="checkbox"/>		NATO CONFIDENTIAL NATO CONFIDENTIEL <input type="checkbox"/>		PROTECTED C PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>		NATO SECRET NATO SECRET <input type="checkbox"/>		CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>
SECRET SECRET <input type="checkbox"/>		COSMIC TOP SECRET COSMIC TRÈS SECRET <input type="checkbox"/>		SECRET SECRET <input type="checkbox"/>
TOP SECRET TRÈS SECRET <input type="checkbox"/>				TOP SECRET TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>				TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>



PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? ☒ No ☐ Yes
Non Oui
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? ☒ No ☐ Yes
Non Oui

Short Title(s) of material / Titre(s) abrégé(s) du matériel :

Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

- | | | | |
|---|---|---|--|
| <input checked="" type="checkbox"/> RELIABILITY STATUS
COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL
CONFIDENTIEL | <input type="checkbox"/> SECRET
SECRET | <input type="checkbox"/> TOP SECRET
TRÈS SECRET |
| <input type="checkbox"/> TOP SECRET- SIGINT
TRÈS SECRET - SIGINT | <input type="checkbox"/> NATO CONFIDENTIAL
NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET
NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET
COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS
ACCÈS AUX EMPLACEMENTS | | | |

Special comments:

Commentaires spéciaux :

Contractor access to Mechanical/Electrical rooms only required

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.

REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail? ☒ No ☐ Yes
Non Oui
If Yes, will unscreened personnel be escorted?
Dans l'affirmative, le personnel en question sera-t-il escorté? ☒ No ☐ Yes
Non Oui

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS? ☒ No ☐ Yes
Non Oui

11. b) Will the supplier be required to safeguard COMSEC information or assets?
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC? ☒ No ☐ Yes
Non Oui

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ? ☒ No ☐ Yes
Non Oui

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS? ☒ No ☐ Yes
Non Oui

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale? ☒ No ☐ Yes
Non Oui



PART C - (continued) / PARTIE C - (suite)

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.

Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.

Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category Catégorie	PROTECTED PROTÉGÉ			CLASSIFIED CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET COSMIC TRÈS SECRET	PROTECTED PROTÉGÉ			CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET
											A	B	C			
Information / Assets Renseignements / Biens Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☒ No
Non ☐ Yes
Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".

Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☒ No
Non ☐ Yes
Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).

Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).



PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
Slaney, Aaron	Project Manager	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
709-691-1846	709-772-7310	Aaron.Slaney@pwgsc-tpsgc.gc.ca	2022/01/24

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
RA Sécurité / AR Security, (TPSGC/PWGSC)	SO	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
--	--	ARsecRA@tpsgc-pwgsc.gc.ca	

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

☐ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

ANNEX B - CERTIFICATE OF INSURANCE
(Not required at solicitation closing)**CERTIFICATE OF INSURANCE****Page 1 of 2**

Description and Location of Work					Contract No.	
					Project No.	
Name of Insurer, Broker or Agent		Address (No., Street)		City	Province	Postal Code
Name of Insured (Contractor)		Address (No., Street)		City	Province	Postal Code
Additional Insured <i>Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services</i>						
Type of Insurance	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
Commercial General Liability Umbrella/Excess Liability				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
				\$	\$	\$
Insert other type of insurance as required				\$		
I certify that the above policies were issued by insurers in the course of their Insurance business in Canada, are currently in force and include the applicable insurance coverage's stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.						
<div></div>				<div></div>		
Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)				Telephone number		
<div></div>				<div></div>		
Signature				Date D / M / Y		

CERTIFICATE OF INSURANCE Page 2 of 2

General

The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverage listed under the corresponding type of insurance on this page.

The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services as an additional Insured.

The Policy shall be endorsed to provide the Owner with not less than 30 days' notice in writing in advance of any cancellation or change or amendment restricting coverage.

Without increasing the limit of liability, the policies must protect all insured parties to the full extent of coverage provided. Further, the policies must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.

Commercial General Liability

The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.

The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:

- (a) Blasting.
- (b) Pile driving and caisson work.
- (c) Underpinning.
- (d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor.

The policy must have the following minimum limits:

- (a) **\$5,000,000** Each Occurrence Limit;
- (b) **\$10,000,000** General Aggregate Limit per policy year if the policy contains a General Aggregate; and
- (c) **\$5,000,000** Products/Completed Operations Aggregate Limit.

Umbrella or excess liability insurance may be used to achieve the required limits.

Builder's Risk / Installation Floater

The insurance coverage provided must not be less than that provided by the latest edition of IBC Forms 4042 and 4047.

The policy must permit use and occupancy of any of the projects, or any part thereof, where such use and occupancy is for the purposes for which a project is intended upon completion.

The policy may exclude or be endorsed to exclude coverage for loss or damage caused by asbestos, fungi or spores, cyber and terrorism.

The policy must have a limit that is **not less than the sum of the contract value** plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Canada at the site of the project to be incorporated into and form part of the finished Work. If the value of the Work is changed, the policy must be changed to reflect the revised contract value.

The policy must provide that the proceeds thereof are payable to Canada or as Canada may direct in accordance with GC10.2, "Insurance Proceeds" (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2>).

Contractors Pollution Liability

The policy must have a limit usual for a contract of this nature, but not less than **\$1,000,000** per incident or occurrence and in the aggregate.

ANNEX D – SPECIFICATIONS AND DRAWINGS / SCOPE OF WORK

(SEE ATTACHED)

**JOSEPH A. GHIZ BUILDING
HARMONIC FILTER INSTALLATION**

Project No.: R.116327.001

January 27, 2022

1 General

1.1 PROFESSIONAL SEALS

Discipline Stamp / Signature / Date

Electrical
(Elliott Coles)



approved

END OF SECTION

TABLE OF CONTENTS

Division 00 - Procurement and Contracting Requirements

00 01 07	SEALS PAGE	1
-----------------	-------------------	----------

Division 01 - General Requirements

01 10 10	GENERAL INSTRUCTIONS	4
01 11 00	SUMMARY OF WORK	3
01 14 00	WORK RESTRICTIONS	2
01 14 10	SCHEDULING AND MANAGEMENT OF WORK	4
01 29 00	PAYMENT PROCEDURES	2
01 31 19	PROJECT MEETINGS	2
01 32 16.16	CONSTRUCTION PROGRESS SCHEDULE - CRITICAL PATH METHOD	8
01 33 00	SUBMITTAL PROCEDURES	3
01 35 24	SPECIAL PROCEDURES ON FIRE SAFETY REQUIREMENTS	2
01 35 25	SPECIAL PROCEDURES ON LOCKOUT REQUIREMENTS	3
01 35 29.06	HEALTH AND SAFETY REQUIREMENTS	7
01 35 44	ENVIRONMENTAL PROCEDURES	2
01 45 00	QUALITY CONTROL	2
01 50 00	TEMPORARY FACILITIES AND CONTROLS	1
01 51 00	TEMPORARY UTILITIES	2
01 61 00	COMMON PRODUCT REQUIREMENTS	2
01 71 00	EXAMINATION AND PREPARATION	1
01 71 10	PROJECT RECORD DOCUMENTS	1

01 73 00	EXECUTION	2
01 74 11	CLEANING	1
01 74 19	WASTE MANAGEMENT & DISPOSAL	3
01 77 00	CLOSEOUT PROCEDURES	1
01 78 00	CLOSEOUT SUBMITTALS	4
01 79 00	DEMONSTRATION & TRAINING	2
01 91 13	GENERAL COMMISSIONING CX REQUIREMENTS	7
01 91 13.13	COMMISSIONING PLAN	7
01 91 13.16	COMMISSIONING FORMS	2

Division 26 - Electrical

26 05 00	COMMON WORK RESULTS - ELECTRICAL	8
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 34	CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS	2
26 05 36	CABLE TRAYS FOR ELECTRICAL SYSTEMS	3
26 35 33	ACTIVE HARMONIC FILTER	3

Drawings

E1	ELECTRICAL SINGLE LINE DISTRIBUTION DRAWING
-----------	--

1 General

1.1 DESCRIPTION OF WORK

- .1 In general, work under this contract consists of but is not limited to:
 - .1 Supply of all material, labour and plant associated with the installation, connection and commissioning of two (2) new 600V, 3Ø free standing active harmonic mitigating filters.
 - .2 Modifications to existing electrical distribution systems as required to connect new electrical infrastructure including all coordination and scheduling of disruptive work activities and connection to facilities existing standby diesel generator.
 - .3 Commissioning services to startup, commission and connect new active harmonic filters and circuit breakers equipment to existing Schneider PME power monitoring system, and verify operation by a manufacturers certified technician.
 - .4 Where contractor is unsure of work to be performed, they shall request direction from Departmental Representative prior to proceeding with work.
 - .5 Whenever it is proposed to make a change or changes in the design, agreement or type of equipment called for in this specification, the electrical contractor shall estimate the cost of same and submit in triplicate detailed itemized estimates of the costs of all apparatus, materials and labour entering into the change or substitution.
 - .6 All work on retrofitting the existing switchgear to be carried out by certified personnel from the manufacturer supplying the equipment.
 - .7 All project related work requiring a shutdown of power for the building must be done between the hours of Saturday 1:00 AM and Sunday 11:00 PM.
- .2 Site of Work is at: Summerside Taxation Centre, 275 Pope Road, Summerside PE.

1.2 FAMILIARIZATION WITH SITE

- .1 Before submitting a bid, a site visit will be arranged for bidders to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

1.3 CODES AND STANDARDS

- .1 Perform work in accordance with the National Building Code of Canada (NBC) 2015 and National Fire Code of Canada (NFC) 2015, NFPA 101 Life Safety Code, and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.
- .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.4 INTERPRETATION OF DOCUMENTS

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.5 TERM ENGINEER

- .1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.6 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.
- .2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.
- .3 Upon approval, cost breakdown will be used as basis for progress payment.

1.7 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda and amendments.
 - .4 Reviewed Shop Drawings.
 - .5 List of outstanding shop drawings.
 - .6 Change Orders.
 - .7 Other modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and other safety related documents.
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

1.8 PERMITS

- .1 In accordance with the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities.

1.9 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- .3 Where elevators or escalators exist in building, only those assigned for Contractor's use may be used for moving workers and material within building. Protect walls of passenger elevators, to approval of Departmental Representative prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .4 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work.

1.10 ROUGHING-IN

- .1 Be responsible for obtaining manufacturer's literature and for correct roughing-in and hook-up of equipment, fixtures and appliances.

1.11 CUTTING FITTING AND PATCHING

- .1 Ensure that cutting and patching required by all trades is included in total bid amount submitted for the work.
- .2 Execute cutting, fitting and patching required to make work fit properly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services.
- .4 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.
- .5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .6 Fit work airtight to pipes, sleeves ducts and conduits.

1.12 CONCEALMENT

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

1.13 LOCATION OF FIXTURES

- .1 Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable.
- .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 Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.14 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to building operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.15 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

1.16 ASBESTOS DISCOVERY

- .1 Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of work, stop work and notify Departmental Representative immediately. Do not proceed with relevant work until written instructions have been received from Departmental Representative.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 10 10 - General Instructions.
- .2 Section 26 05 03 - Electrical Removals and Alterations.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises construction activities related to the installation of new harmonic filters located at the Joseph A. Ghiz Building, 275 Pope Road, Summerside, PE.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Project construction progress schedule in accordance with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method.
- .3 Submit site-specific and Work Plan Health and Safety Plan in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 WORK BY OTHERS

- .1 Not applicable.

1.5 FUTURE WORK

- .1 Not applicable.

1.6 WORK SEQUENCE

- .1 Construct Work in stages to accommodate continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Facility day-to-day use and Occupancy during construction.
- .3 Construct Work to provide for continuous usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4 Maintain fire access/control.
- .5 Protect workers and public safety.

1.7 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of site until Substantial Performance.
- .2 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Continued and undisturbed occupancy.
 - .2 Public usage.
- .3 Co-ordinate use of premises under direction of Departmental Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 Refer to Section 01 51 00 - Temporary Utilities for temporary facilities, access, and utilities.
- .6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .8 Ensure that operations conditions of exiting work at completion are still the same, equal to or better than that which existed before new work started.

1.8 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner and Departmental Representative in scheduling operations to minimize conflict and to facilitate Owner usage.

1.9 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Consultant to facilitate execution of work.

1.10 EXISTING SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative one (1) week notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .3 Submit schedule for approval by Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services as indicated in Section 26 05 03 - Electrical Removals and Alterations to maintain critical building and tenant services.
- .5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.

1.11 DOCUMENTS REQUIRED

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

2 Products

2.1 NOT USED

- .1 Not used.

3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method.
- .2 Section 26 05 03 - Electrical Removals and Alterations.

1.2 ACCESS AND EGRESS

- .1 Maintain "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants. Refer to Specification Section 26 05 03 - Electrical Removals and Alterations for additional information.

1.6 SPECIAL REQUIREMENTS

- .1 Paint and carpet public or Departmental Representative occupied areas Monday to Friday from 18:00 to 07:00 hours only and on Saturdays, Sundays, and statutory holidays.
- .2 Carry out noise generating Work Monday to Friday from 18:00 to 07:00 hours and on Saturdays, Sundays, and statutory holidays.
- .3 Submit schedule in accordance with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method (CPM).
- .4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .5 Keep within limits of work and avenues of ingress and egress.

1.7 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:

- .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
- .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
- .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
- .4 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.
- .3 Security escort:
 - .1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
 - .2 Submit an escort request to Departmental Representative at least fourteen (14) days before service is needed.

1.8 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 SUBMITTALS

- .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
 - .1 Work Schedule as specified herein.
 - .2 Shop Drawing Submittal Schedule specified in section 01 33 00.
 - .3 Waste Management Plan specified in section 01 74 21.
 - .4 Environmental Plan specified in section 01 35 43.
 - .5 Health and Safety Plan specified in section 01 35 29.06.
 - .6 Hot Work Procedures specified in section 01 35 24.
 - .7 Lockout Procedures specified in section 01 35 25.
 - .8 Dust Control Plan specified in section 01 50 00.
 - .9 List of workers requiring security clearance and those to be placed on Site Security Control list.

1.2 WORK SCHEDULE

- .1 Upon acceptance of bid submit:
 - .1 Work schedule within 7 calendar days of contract award.
- .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
- .3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .4 Work Schedule:
 - .1 Prepare by use of Critical Path Method (CPM) indicating:
 - .1 Complete and detailed sequence of all construction activities. Show projected start and completion dates for each activity.
 - .2 Number of calendar days required to carryout each activity.
 - .3 Critical path items with resulting critical dates, non-critical activities and resulting float time.
 - .4 Actual workdays from non-working days such as weekend and statutory days etc.
 - .5 Projected and actual percentage of work completed for each major work activity.
 - .2 Prepare CPM schedule by use of well recognized and widely used electronic software. Submit copy of schedule in paper format and one electronic version on diskette for each submission.
 - .3 Accompany CPM with written narrative as required and in sufficient detail to fully describe work and demonstrate a reasonable implementation plan for completion of project within designated time.
- .5 Work schedule must take into consideration and reflect the required sequence of work, special conditions including temporary disruptions, and operational restrictions as specified below and indicated on drawings.
- .6 Schedule work in cooperation with the Departmental Representative. Incorporate within Work Schedule, items identified by Departmental Representative during review of schedule.
- .7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.

- .9 Schedule Updates:
 - .1 Submit on a monthly basis or when requested by Departmental Representative.
 - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
 - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
- .10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .11 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 PROJECT PHASING

- .1 Be aware that Facility and tenants must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.
- .2 Perform Work of this contract in individual phases as indicated on the drawings.
- .3 Unless indicated or approved otherwise, complete all work of a particular phase prior to commencement of another phase. Obtain Departmental Representative's permission prior to moving between phases.

1.4 OPERATIONAL RESTRICTIONS

- .1 The Contractor must recognize that building occupants will be affected by implementation of this Contract. The Contractor must perform the work with utmost regard to the safety and convenience of building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.
- .2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.
- .3 To assure that construction work may proceed productively without risk to safety of building occupants and the public, and due to the nature of the tenant's operation be aware that certain work of this contract must be carried out during "Off-Hours".
- .4 Off Hours: means a period of time which is outside the daily operational hours of the tenants of the Facility. For the purposes of this contract, Off-Hours are defined as follows:
 - .1 Weeknight Off-Hours: between the hours of 18:00 and 07:00 for each weekday Monday to Thursday inclusive.
 - .2 Weekend Off-Hours: between the hours of 18:00 Friday evening to 07:00 Monday morning.
 - .3 All project related work requiring a shutdown of power for the building must be done between the hours of Saturday 01:00 hours and Sunday 23:00 hours.
 - .4 Dependent on the nature and location of the construction activity and due to an unanticipated operational requirement of the Tenant, certain off-hour periods may be redefined by adjusting the start and end time periods or cancellation of a specific off-hour workshift during the course of the Work.
- .5 The following work shall be performed during Off-Hours:
 - .1 Cleaning and preparing of occupied areas for daytime use by tenants immediately following an off-hour workshift;

- .2 Work within a tenant occupied area including corridors, stairwells and other circulation routes under use;
- .3 Work which requires the temporary disconnection of power and communication services to occupied areas;
- .4 Testing of fire alarms and other emergency annunciating system;
- .5 Delivery of materials and equipment from exterior to the interior of building when access routes are located in tenant occupied spaces.
- .6 Work which creates excessive noise or vibration creating interference with tenant operations.
- .6 Departmental Representative reserves the right to stop certain daytime work activities, if the nature of that activity generates excessive noise or dust and have Contractor re-schedule that particular work to be performed during the Off-Hour period.
- .7 Ensure that all trades are aware of the "Off-Hour" requirements of this Contract and ensure that any extra costs incurred as a result is included in the Contractor's bid amount for the work. No extra cost will be paid due to failure by General Contractor or his sub-contractors to recognize the off-hour requirements and other restrictions specified herein and to include all necessary allowances within their bids.
- .8 Facility circulation maintained:
 - .1 Ensure that entrances, corridors, stairwells, fire exits and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire work.
 - .2 Maintain those areas clean and free of construction materials and equipment. Provide temporary dust barriers and other suitable enclosures to ensure users are not exposed to construction activities and are protected from exposure to dust, noise and hazardous conditions.
 - .3 Provide temporary corridors, walkways, passageways, access to offices, etc. when required due to nature of work. Such circulation routes must be constructed to barrier free requirements unless approved otherwise by Departmental Representative.
 - .4 Maintain fire escape routes accessible and firefighting access open all times for the duration of the project.
 - .5 Do not under any circumstances block fire exit doors. Do not leave construction materials or debris in corridors, stairwells building entrances and exits.

1.5 PROJECT MEETINGS

- .1 Schedule and administer project meetings, held on a minimum weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.
- .2 Prepare agenda for meetings.
- .3 Notify participants in writing four (4) days in advance of meeting date.
 - .1 Ensure attendance of all subcontractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.
- .4 Hold meetings at project site or where approved by Departmental Representative.
- .5 Preside at meetings and record minutes.
 - .1 Indicate significant proceedings and decisions. Identify action items by parties.
 - .2 Distribute to participants by mail or by facsimile within three (3) calendar days after each meeting.
 - .3 Make revisions as directed by Departmental Representative.
 - .4 Departmental Representative will advise whether submission of minutes by Email is acceptable. Decision will be based on compatibility of software among participants.

1.6 WORK COORDINATION

- .1 General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
 - .1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.
- .2 General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.
 - .1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
- .3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.
- .4 Work Cooperation:
 - .1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.
- .5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at own cost.

END OF SECTION

1 General

1.1 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Make applications for payment on account monthly 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 Departmental Representative, at least fourteen (14) days before first application for payment. Schedule of values for parts of Work, aggregating total amount of Contract Price, to facilitate evaluation of applications for payment.

1.2 SCHEDULE OF VALUES

- .1 Provide schedule of values supported by evidence as Departmental Representative may reasonably direct and when accepted by Departmental Representative, 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 Departmental Representative may reasonably require to establish value and delivery of products.

1.3 PROGRESS PAYMENT

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

1.4 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Prepare and submit to Departmental Representative comprehensive list of items to be completed or corrected and apply for a review by Departmental Representative to establish Substantial Performance of Work. Failure to include items on list does not alter responsibility to complete Contract.
- .2 No later than ten (10) days after receipt of list and application, Departmental Representative will review Work to verify validity of application, and no later than seven (7) days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
- .3 Departmental Representative: state date of Substantial Performance of Work or designated portion of Work in certificate.
- .4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Departmental Representative, establish reasonable date for finishing Work.

1.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 After issuance of certificate of Substantial Performance of Work:
 - .1 Submit application for payment of holdback amount.
 - .2 Submit sworn statement that 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 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, Departmental Representative will issue certificate for payment of holdback amount.
- .3 Where holdback amount has not been placed in a separate holdback account, Owner will, ten (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. Where lien legislation does not exist or apply, holdback amount is due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between parties. Owner may retain out of holdback amount sums required by law to satisfy 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.

1.6 PROGRESSIVE RELEASE OF HOLDBACK

- .1 Where legislation permits, if Departmental Representative has certified that Work of subcontractor or supplier has been performed prior to Substantial Performance of Work, Owner will 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 In addition to provisions of preceding paragraph, and certificate wording, 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.

1.7 FINAL PAYMENT

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

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings (virtual via MS Teams or other) throughout the progress of the work every two weeks or at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings, and/or arrange virtual meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within fifteen (15) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method (CPM).
 - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
 - .5 Delivery schedule of specified equipment.
 - .6 Site security.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .8 Owner provided products.
 - .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
 - .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
 - .12 Monthly progress claims, administrative procedures, photographs, hold backs.

- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

- .1 During course of Work schedule progress meetings every two (2) weeks.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative and Consultant are to be in attendance.
- .3 Notify parties minimum four (4) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 33 00 - Submittal Procedures

1.2 REFERENCE STANDARDS

- .1 Project Management Institute (PMI Standards)
 - .1 A Guide to the Project Management Body of Knowledge (PMBOK Guide) - Fifth Edition.
 - .2 Practice Standard for Scheduling - 2011.

1.3 DEFINITIONS

- .1 Activity: Distinct, scheduled portion of work performed during course of a project.
- .2 Activity Duration: time in calendar units between start and finish of a scheduled activity. See also Duration.
- .3 Assumption: factor in planning process that is considered true, real, or certain without proof or demonstration.
- .4 Bar Chart (Gantt Chart): graphic display of schedule-related information.
 - .1 In typical bar chart, schedule activities or work breakdown structure components are listed down left side of chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars.
- .5 Baseline: approved version of a work product that can be changed only through formal change control procedures and is used as a basis for comparison.
- .6 Budget: approved estimate for a project or work breakdown structure component or schedule activity.
- .7 Cash Flow: projection of progress payment requests based on cash loaded construction schedule.
- .8 Change Control: process whereby modifications to documents, deliverables, or baselines associated with a project are identified, documented, approved, or rejected.
- .9 Completion Milestones: they are firstly Substantial Completion and secondly Final Certificate.
- .10 Constraint: scheduled limiting factor that effects execution of a project, program, portfolio, or process.
- .11 Contract: mutually binding agreement that obligates a seller to provide a specified product or service or result and obligates a buyer to pay for it.
- .12 Control: comparing actual performance with planned performance, analyzing variance, assessing trends, to effect process improvements, evaluating possible alternatives, and recommending appropriate corrective action as needed.
- .13 Corrective Action: intentional activity that realigns performance of project work with project management plan.
- .14 Critical Path: sequence of activities that represents longest path through a project, which determines shortest possible duration.
- .15 Critical Path Activity: activity on critical path in a project schedule.
- .16 Critical Path Method (CPM): method used to estimate minimum project duration and determine amount of scheduling flexibility on logical network of paths within schedule model.
- .17 Data Date: point in time when the status of the project is recorded.
- .18 Decomposition: technique used for dividing and subdividing project scope and project deliverables into smaller, more manageable parts.
- .19 Deliverable: unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.

- .20 Duration: total number of work periods (not including holidays or other non-working periods) required to complete a schedule activity or work breakdown structure component.
 - .1 Usually expressed as workdays or work weeks.
- .21 Early Finish Date (EF): in Critical Path Method, earliest possible point in time when uncompleted portions of schedule activity can finish based on schedule network logic, data date, and schedule constraints.
 - .1 Early finish dates can change as Project progresses and changes are made to Project plan.
- .22 Early Start Date (ES): in Critical Path Method, earliest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, data date, and schedule constraints.
 - .1 Early start dates can change as Project progresses and changes are made to Project Plan.
- .23 Execute: directing, managing, performing, and accomplishing project work; providing deliverables, and providing work performance information.
- .24 Finish Date: point in time associated with a schedule activity's completion.
 - .1 Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.
- .25 Float: (also known as slack) amount of time a schedule activity can be delayed without delaying early start date of a successor or violating a schedule constraint.
 - .1 This resource is available to both PWGSC and Contractor.
- .26 Forecast: estimate or prediction of conditions and events in project future based on information and knowledge available at time of forecast.
 - .1 Information is based on projects past performance and expected future performance, and includes information that could impact project in future, a such as estimate at completion and estimate to complete.
- .27 Gantt Chart: see Bar Chart.
- .28 Impact Analysis: schedule analysis technique that adds a modeled delay to an accepted construction schedule to determined possible outcome of that delay on project completion.
- .29 Imposed Date: a fixed date imposed on a schedule activity or schedule milestone, usually in form of a "start no earlier than" and "finish no later than" date.
- .30 Lag: amount of time whereby a successor activity is required to be delayed with respect to a predecessor activity.
- .31 Late Finish Date (LF): in critical path method, latest possible point in time when uncompleted portions of a schedule activity can finish based on schedule network logic, project completion date, and schedule constraints.
- .32 Late Start Date (LS): in critical path method, latest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, project completion date, and schedule constraints.
- .33 Lead: amount of time whereby a successor activity can be advanced with respect to a predecessor activity.
- .34 Logic Diagram: see Project network diagram.
- .35 Logical Relationship: dependency between two activities or between an activity and a milestone.
- .36 Master Schedule: summary-level schedule that identifies major deliverable; work breakdowns structure components, and key schedule milestones.
- .37 Milestone: significant point or event in a project, program, or portfolio.
- .38 Monitor: collect project performance data with respect to a plan, procedure performance measures, and report and disseminate performance.
- .39 Network: see Project Schedule Network Diagram.
- .40 Non-Critical Activities: activities which when delayed, do not affect specified Contract duration.

- .41 Project Control System: fully computerized system utilizing commercially available software packages.
- .42 Project Management: application of knowledge, skills, tools, and techniques, to project activities to meet project requirements.
- .43 Project Management Plan: approved document that describes how project will be executed, monitored, and controlled.
 - .1 Primary uses of Project management plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.
 - .2 Project management plan may be summary or detailed.
- .44 Project Management Planning: development and maintenance of Project Management Plan.
- .45 Project Management Planning, Monitoring and Control System: overall system operated to enable monitoring of Project Work in relation to established milestones.
- .46 Project Schedule: planned dates for performing activities and planned dates for meeting milestones.
- .47 Project Schedule Network Diagram: graphical representation of logical relationships among project schedule activities.
 - .1 Always drawn from left to right to reflect Project chronology.
- .48 Project Scope: work performed to deliver a product, service, or result with specified features and functions.
- .49 Quantified days duration: working days based on 5 day work week, discounting statutory holidays.
- .50 Risk: uncertain event or condition that, if it occurs, has positive or negative effect on one or more project objectives.
- .51 Schedule: see Project Schedule.
- .52 Schedule Data: collection of information for describing and controlling schedule.
- .53 Scope: see Project Scope.
- .54 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.
- .55 Work Breakdown Structure (WBS): hierarchical decomposition of total scope of work to be carried out by project team to accomplish project objectives and create the required deliverables.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Project Meeting:
 - .1 Meet with Departmental Representative and Consultant within ten (10) working days of Award of Contract date, to establish Work requirements and approach to project construction operations.
 - .2 Participate in regular project progress meetings with Departmental Representative and Consultant specifically intended to discuss update of detailed schedule and contract changes.
- .2 Scheduling:
 - .1 Ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made.
 - .2 Ensure project schedule efficiencies through monitoring of project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.
 - .3 Monitor sufficiently often so that causes of delays can immediately be identified and mitigated.
- .3 Project monitoring and reporting:

- .1 Keep team aware of changes to schedule, and potential consequences as project progresses.
- .2 Use narrative reports to provide advice on seriousness of challenges and measures to overcome them.
- .3 Begin narrative reporting with statement on general status of project followed by summarization of delays, potential problems, corrective measures and project status criticality.
- .4 Critical Path Method (CPM) Requirements:
 - .1 Ensure Master Plan and Detail Schedule are practical and remain within specified contract duration.
 - .2 Revise Master Schedule and Detail Schedule deemed impractical by Departmental Representative and resubmit for approval.
 - .3 Change to Contract Duration:
 - .1 Acceptance of Master Schedule and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract.
 - .2 Duration of Contract may only be changed through bilateral Agreement.
 - .4 Consider Master Schedule and Detail Schedule deemed practical by Departmental Representative, showing Work completed in less than specified Contract duration, to have float.
 - .5 First Milestone on Master Schedule and Detail Schedule will identify start Milestone with an Early Start, "ES", constraint date equal to Award of Contract date.
 - .6 Calculate dates for completion of milestones from Plan and Schedule using specified time periods for Contract.
 - .7 Substantial Completion with Late Finish, "LF", constraint equal to calculated date.
 - .8 Calculations on updates such that if early finish of Interim Certificate falls later than specified Contract duration then float calculation to reflect negative float.
 - .9 Delays to non-critical activities with float may not be basis for time extension.
 - .10 Do not use float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates other than required by Contract.
 - .11 Allow for adverse weather conditions normally anticipated and show in Master Plan and Detail Schedule.
 - .1 Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.
 - .12 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration.
 - .1 Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.
 - .13 Arrange participation on and off site of subcontractors and suppliers, as required by Departmental Representative for purpose of network planning, scheduling, updating and progress monitoring.
 - .1 Approvals by Departmental Representative of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.
 - .14 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.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Submit to Departmental Representative Project Control System for planning, scheduling, monitoring and reporting of project progress.
- .3 Submit Project Control System to Departmental Representative for approval.
 - .1 Failure to comply with each required submission, may result in progress payment being withheld in accordance with Federal Government's GC 5 Terms of Payment.
- .4 Include costs for execution, preparation and reproduction of schedule submittals in bid documents.
- .5 Submit letter ensuring that schedule has been prepared in co-ordination with major sub-contractors.
- .6 Refer to article "PROGRESS MONITORING AND REPORTING" of this specification Section for frequency of Project control system submittals.
- .7 Submit impact analysis of schedule for changes that result in extension of contract duration.
 - .1 Include draft schedule update and report as outlined in article "PROGRESS MONITORING AND REPORTING".
- .8 Submit Project planning, monitoring and control system data as part of initial schedule submission and monthly status reporting as required by Departmental Representative in following form.
 - .1 Master Schedule Bar Chart.
 - .2 Construction Detail Schedule Bar Chart.
 - .3 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.
 - .4 Criticality report listing activities and milestones with up to five (5) days total float used as first sort for ready identification of critical or near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.

1.6 QUALITY ASSURANCE

- .1 Use experienced personnel, fully qualified in planning and scheduling to provide services from start of construction to Final Certificate, including Commissioning.

1.7 WORK BREAKDOWN STRUCTURE (WBS)

- .1 Prepare construction Work Breakdown Structure (WBS) within fourteen (14) working days of Award of Contract date.
 - .1 Develop WBS through at least five levels: project, stage, element, sub-element and work package.

1.8 PROJECT MILESTONES

- .1 Mandatory and recommended project milestones form targets for both Master Schedule and Detail Schedule of CPM construction network system.
 - .1 Temporary shutdown of switchgear Bus #1 for measurements required for switchgear extension.
 - .2 Submittal of engineered shop drawings for switchgear extension from manufacturer.
 - .3 Equipment delivery and component fabrication schedules.
 - .4 Temporary shutdown of Bus #2 for installation of AHF #2 breaker.
 - .5 Temporary shutdown of Bus #1 for switchgear extension.
 - .6 Connection and commissioning of both active harmonic filters and networking to existing Schneider power monitoring systems.
 - .7 Substantial Completion.

1.9 MASTER SCHEDULE

- .1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.
- .2 Prepare comprehensive construction Master Schedule (CPM logic diagram) and dependent Cash Flow Projection within fourteen (14) working days of finalizing Agreement to confirm validity or alternates of identified milestones.
 - .1 Master Schedule will be used as baseline.
 - .1 Revise baseline as conditions dictate and as required by Departmental Representative.
 - .2 Departmental Representative as Project progresses will review and return revised baseline within five (5) working days.
- .3 Reconcile revisions to Master Schedule and Cash Flow Projections with previous baseline to provide continuous audit trail.
- .4 Initial and subsequent Master Schedule will include:
 - .1 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
 - .2 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
 - .3 Actual/projected monthly cash flow: expressed monthly and shown in both graphical and numerical form.

1.10 DETAIL SCHEDULE

- .1 Provide detailed project schedule (CPM logic diagram) within five (5) working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
 - .1 Shop drawings.
 - .2 Samples.
 - .3 Approvals.
 - .4 Procurement.
 - .5 Construction.
 - .6 Installation.
 - .7 Site works.
 - .8 Testing.
 - .9 Commissioning and acceptance.
- .2 Detail CPM schedule to cover in detail minimum period of six (6) months beginning from Award of Contract date.
 - .1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.
 - .2 Detail activities completely and comprehensively throughout duration of project.
- .3 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Schedule.
- .4 Clearly show sequence and interdependence of construction activities and indicate:
 - .1 Start and completion of all items of Work, their major components, and interim milestone completion dates.
 - .2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
 - .1 Time for submittals, resubmittals and review.
 - .2 Time for fabrication and delivery of manufactured products for Work.
 - .3 Interdependence of procurement and construction activities.
 - .3 Include sufficient detail to assure adequate planning and execution of Work. Activities generally range in duration from one (1) to three (3) workdays each.

- .5 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow co-ordination and control of project activities. Show continuous flow from left to right.
- .6 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form "Critical Path". Increased number of critical activities is seen as indication of increased risk.
- .7 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Departmental Representative for review effects created by insertion of new Change Order.

1.11 REVIEW OF CONSTRUCTION DETAIL SCHEDULE

- .1 Allow minimum five (5) work days for review by Departmental Representative of proposed construction Detail Schedule unless otherwise specified.
- .2 Upon receipt of reviewed Detail Schedule make necessary revisions and resubmit to Departmental Representative for review within maximum five (5) work days unless otherwise specified.
- .3 Promptly provide additional information to validate practicability of Detail Schedule as required by Departmental Representative.
- .4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.

1.12 COMPLIANCE WITH DETAIL SCHEDULE

- .1 Comply with reviewed Detail Schedule.
- .2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay, only after written receipt of approval by Departmental Representative.
- .3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.
 - .1 Corrective measures may include:
 - .1 Increase of personnel with more experience/qualifications on site for effected activities or work package.
 - .2 Additional work shifts or shutdowns.
- .4 Submit to Departmental Representative justification, project schedule data and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. As part of supporting evidence, include:
 - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved contract schedule.
 - .2 Prepared schedule indicating how change will be incorporated into overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
 - .3 Other supporting evidence requested by Departmental Representative.
 - .4 Do not assume approval of Contract extension prior to receipt of written approval from Departmental Representative.
- .5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.
 - .1 Departmental Representative will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.
 - .2 Construction delays affecting project schedule will not constitute justification for extension of contract completion date.

1.13 PROGRESS AND REPORTING

- .1 On an ongoing basis, Detail Schedule on job site to show "Progress to Date". Arrange participation on and off site of subcontractors and suppliers, as, and when necessary, for purpose of network planning, scheduling, updating and progress monitoring. Inspect Work with Departmental Representative at least once monthly to establish progress on each current activity shown on applicable networks.
- .2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.
- .3 Perform Detail Schedule update monthly with status dated (Data Date) on last working day of month. Update to reflect activities completed to date, activities in progress, logic and duration changes.
- .4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.
- .5 Submit to Departmental Representative copies of updated Detail Schedule.
- .6 Requirements for monthly progress monitoring and reporting are basis for progress payment request.
- .7 Submit monthly written report based on Detail Schedule, showing Work to date performed, comparing Work progress to planned, and presenting current forecasts. Report summarize progress, defining problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate potential delay. Include in report:
 - .1 Description of progress made.
 - .2 Pending items and status of: permits, shop drawings, change orders.
 - .3 Status of Contract completion date and milestones.
 - .4 Current and anticipated problem areas, potential delays and corrective measures.
 - .5 Review of progress and status of Critical Path activities.

2 Products

2.1 NOT USED

- .1 Not used.

3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 01 78 00 - Closeout Submittals.
- .2 Section 01 91 13 - General Commissioning Cx Requirements

1.2 SUBMITTAL GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions have been reviewed.
- .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, provide soft converted values.
- .6 Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
 - .1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .9 Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .10 Submittal format:
 - .1 Submit paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.
 - .2 Submit in electronic format as pdf files. Forward pdf and in the native program format, MS Word, MS Excel, MS Project, Autocad dwg, and photograph jpg through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
- .11 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.
- .12 Keep one reviewed copy of each submittal document on site for duration of Work.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
- .2 Shop Drawing Quantities: submit sufficient copies required by the General Contractor and sub-contractors plus three (3) copies which will be retained by Departmental Representative.

- .1 Ensure sufficient copies are submitted to enable one complete set to be included in each of the maintenance manuals specified in 01 78 00.
- .3 Shop Drawings Format:
 - .1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.
 - .2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.
 - .3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.
- .4 Shop Drawings Content:
 - .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.
 - .2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.
 - .3 Delete information not applicable to project on all submittals.
 - .4 Equipment installation/start-up data: include manufacturer's recommended installation instructions, pre-start and start-up checklists for those pieces of equipment and systems designated to be commissioned as specified in section 01 91 13.
- .5 Allow fourteen (14) calendar days for Departmental Representative's review of each submission.
- .6 Adjustments or corrections made on shop drawings by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
- .7 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.
- .8 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.
- .9 Accompany each submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and project number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .10 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and project 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 Cross references to particular details of contract drawings and specifications section number for which shop drawing submission addresses.
- .6 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.
- .11 After Departmental Representative's review, distribute copies.
- .12 The review of shop drawings by the Departmental Representative or by an authorized Consultant or designate is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

- .1 Not used.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Fire Safety Requirements.
- .2 Existing Fire Protection and Alarm Systems.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 - Health and Safety Requirements.

1.3 REFERENCES

- .1 National Fire Code 2015
- .2 National Building Code 2015
- .3 Applicable OHS legislation

1.4 DEFINITIONS

- .1 Hot Work - applies to hot works involving open flames or producing heat or sparks, including, without being limited to, cutting, welding, soldering, brazing, grinding, adhesive bonding, thermal spraying and thawing pipes.

1.5 SUBMITTALS

- .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within fourteen (14) calendar days of acceptance of bid.
- .2 Submit request for fire alarm disruption in accordance with section 01 33 00.

1.6 FIRE SAFETY REQUIREMENTS

- .1 Implement and follow fire safety measures during Work. Comply with following:
 - .1 National Fire Code 2015.
 - .2 National Building Code 2015.
 - .3 Provincial OHS Acts and Regulations.
 - .4 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes."
- .2 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, Departmental Representative will advise on the course of action to be followed.

1.7 HOT WORK AUTHORIZATION

- .1 Hot work will not be permitted. All equipment to be prefabricated off site.

1.8 PREVENTION OF FIRES

- .1 Protection of Combustible and Flammable Materials
 - .1 Any combustible and flammable material, dust or residue shall be:
 - .1 Protected against ignition by the use of noncombustible materials.
 - .2 Any process or activity that produces flammable gases or vapours, combustible dusts or combustible fibres in quantities sufficient to create a fire or explosion hazard shall be interrupted and the hazardous conditions shall be removed before any work.

1.9 FIRE PROTECTION AND ALARM SYSTEMS

- .1 Fire protection and alarm systems shall not be:
 - .1 Obstructed.
 - .2 Shut-off, unless approved by Departmental Representative.

- .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 firefighting
- .3 Costs incurred, from the fire department and Facility owner, 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.

1.10 DOCUMENTS ON SITE

- .1 Keep Hazard assessment documentation on site for duration of Work.
- .2 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Procedures to isolate and lockout electrical facility and other equipment from energy sources.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 - Health and Safety Requirements

1.3 REFERENCES

- .1 CSA C22.1-21, Canadian Electrical Code,
- .2 CAN/CSA-C22.3 No.1-06, Overhead Systems.
- .3 CSA C22.3 No.7-06, Underground Systems.
- .4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.4 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 has been 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.

1.5 COMPLIANCE REQUIREMENTS

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
 - .1 Canadian Electrical Code 2021.
 - .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 Procedures specified herein.
 - .5 CSA Z 460-13 (R2018) Control of Hazardous Energy – Lock out and other methods
 - .6 CSA Z 462-18 Workplace Electrical Safety
- .2 In event of conflict between any provisions noted above, the most stringent provision will apply.

1.6 SUBMITTALS

- .1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00. Submit within fourteen (14) calendar days of acceptance of bid.

1.7 ISOLATION OF EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.
- .2 To obtain authorization, submit to Departmental Representative the following documentation:
 - .1 Written request to isolate the particular service or facility and;
 - .2 Copy of Contractor's Lockout Procedures.
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
 - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
 - .2 Where no form exist, make written request indicating:
 - .1 The equipment, system or service to be isolated and it's location;
 - .2 Duration of isolation period (ie: start time & date and completion time & date).
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
- .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing to proceed with the work.
 - .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
- .6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.
- .7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard. Provide temporary power to other equipment that needs to be remain operational if a shutdown is not possible
- .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.06.

1.8 LOCKOUTS

- .1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.
- .2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
- .3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.
- .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
 - .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.

- .2 Duties of person managing the permit system to include:
 - .1 Issuance of permits and lockout tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Making a Request for Isolation to Departmental Representative when required as specified above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated.
 - .7 Collecting and safekeeping lockout tags returned by workers as a record of the event.
- .5 Clearly establish, describe and allocate responsibilities of:
 - .1 Workers.
 - .2 Person managing the lockout permit system.
 - .3 Safety Watcher.
 - .4 Subcontractor(s) and General Contractor.
- .6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
 - .1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.
 - .2 Clearly label the document as being the Lockout procedures applicable to work of this contract.
- .7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .8 Use industry standard lockout tags.
- .9 Provide appropriate safety grounding and guards as required.

1.9 CONFORMANCE

- .1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

1.10 DOCUMENTS ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

END OF SECTION

1 General

1.1 RELATED ACTIONS

- .1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.
- .2 Section 01 35 25 - Special Procedures on Lockout Requirements.

1.2 DEFINITIONS

- .1 Competent Person: means a person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .2 Medical Aid Injury: any injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .3 PPE: personal protective equipment.
- .4 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.
- .5 Incident - occurrence, condition, or situation arising in the course of work that resulted in or could have resulted in injury, illness, property damage, environmental issues or fatality.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit Site-Specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within fourteen (14) work days of notification of Bid Acceptance. Allow for 5-10 days for Department review and recommendations prior to the commencement of work. Provide three (3) copies.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.
 - .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
 - .5 Submit revisions and updates made to the Plan during the course of Work.
- .3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit permit and compliance certificates.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other Department of Labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal or Provincial authorities within 24 hours after the visit to the Departmental Rep.

- .7 Submit copies of incident reports (incident, accident, injury, near-miss, fire, explosion, chemical spill or damage to property occurring at the work site) 24 hours after the event to the Departmental Representative.
- .8 Submit documented plans as prescribed through Public Health requirements, directions, orders and declarations. Include industry best practices when preparing the plan and revise/update accordingly and in a timely manner as per Public Health requirements and recommended industry best practices.

1.4 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for Province of Prince Edward Island, and Occupational Health and Safety Regulations made pursuant to the Act.
- .2 Comply with Provincial/Federal Public Health requirements, directions, and declarations. Prepare documented plans as prescribed by Public Health and/or industry best practices in consultation with the Departmental Representative.
- .3 Observe construction safety measures of:
 - .1 NBC 2015, Division B, Part 8.
 - .2 NFC 2015,
 - .3 Municipal by-laws and ordinances.
- .4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 RESPONSIBILITY

- .1 The constructor shall:
 - .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
 - .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.6 SITE CONTROL AND ACCESS

- .1 The constructor shall:
 - .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
 - .2 Isolate Work Site from other areas of the premises by use of appropriate means.

- .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 for minimum acceptable requirements.
- .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
- .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site. Maintain records of such orientation on site for review and audit by the DR or their authorized inspector.
- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.7 PROTECTION

- .1 The constructor shall:
 - .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
 - .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.8 FILING OF NOTICE

- .1 The constructor shall:
 - .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work. Departmental Representative will assist in locating address if needed.

1.9 PERMITS

- .1 The constructor:
 - .1 Is responsible to pay all fees to obtain all permits required to conduct the work.
 - .2 Is responsible to provide authorities with plans and information for acceptance certificates and the costs arising from same.
 - .3 Is responsible to provide inspections certificates as evidence that work conforms to requirements of Authorities Having Jurisdiction (AHJ)
 - .4 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.
 - .5 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 HAZARD ASSESSMENTS

- .1 The constructor shall:
 - .1 Perform a documented site specific Project hazard assessment for the Work. Include any site issues / hazards / concerns identified arising from the site visit that must be considered.

- .2 Carryout initial assessment prior to commencement of Work with further assessments completed and documented as needed during progress of work, (including when new trades and subcontractors arrive on site).
- .3 Record results and address in Health and Safety Plan.
- .4 Share information and controls identified from original and updated Project hazard assessments with project workers. Record this information sharing complete with names and dates. Keep documentation on site for entire duration of the Work.

1.11 PROJECT/SITE CONDITIONS

- .1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
 - .1 Electrical hazards.
 - .2 Lock out procedures required.
 - .3 PPE requirements.
 - .4 CPHO and Federal COVID protocols to be followed.
 - .5 Facility on-going operations:
 - .1 Contractor shall cooperate with users of Facility.
 - .2 Should interference occur, take direction from Departmental Representative.
 - .3 Do not unreasonably encumber site with materials.
 - .4 Work to mitigate Facility disruptions.
- .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
- .3 Include above items in the hazard assessment of the Work.
- .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.12 MEETINGS

- .1 The constructor shall:
 - .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Designated Health & Safety Site Representative.
 - .3 Subcontractors.
- .2 Conduct pre shift tool box talks with the crew and conduct regularly scheduled (minimum bi-weekly) safety meetings during the Work.
- .3 Keep documents on site for review by DR or their authorized rep.

1.13 HEALTH AND SAFETY PLAN

- .1 The constructor shall:
 - .1 Prior to commencement of Work, develop a written Site Specific Safety Plan for the Project. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
 - .2 Items to include in the Site Specific Safety Plan;
 - .1 Name of the designated Site Safety Rep showing proof of his/her competence and reporting relationship in Contractor's company. This person is expected to be on site during all work execution.
 - .2 A copy of a current WCB Letter of Good Standing.
 - .3 Details as to how WHMIS 2015 / GHS will be managed on site.
 - .4 Details as to how the Project work areas will be delineated /protected from other areas of the premises.(fences, signs). Must be project specific.

- .5 Details as to how Safety orientations will be managed. Include a summary of what topics are covered in the safety orientation described in this section?
- .6 A copy of a Notice of Project that was sent to the Provincial OHS regulator.
- .7 Project site specific hazard assessment.
- .8 Details as to how tool box and safety meetings will be held and recorded.
- .9 On-site Emergency Response Plans that cover all potential emergency situations that could arise. This should harmonize with the facility if possible. Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors. (key personnel)
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
- .10 List of critical work activities which have a risk of endangering health and safety of Facility users and/or others.
- .11 Details as to how the subcontractors documented safety program will be reviewed and managed prior to allowing them to work on site.
- .12 Details as to how the site safety inspection program will be managed. Include frequency, assignment of responsibility as well as standard inspection form to be used.
- .13 Basic PPE requirements as well as specialized PPE requirements; minimum being hard hat, safety footwear, safety glasses and high vis vest.
- .14 General safety rules as well as the disciplinary protocols to be taken for noncompliance.
- .15 Details as to how Incident investigations will be managed. Include procedure and incident form.
- .2 Post copy of the Plan, and updates, prominently on Work Site.

1.14 SAFETY SUPERVISION

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum daily basis. Record deficiencies and remedial action taken.
 - .2 Follow-up and ensure corrective measures are taken.
 - .3 Share inspection reports with crews / subs
- .6 Cooperate with the Facility's and / or the PSPC Occupational Health and Safety representative.

- .7 Keep inspection reports and supervision related documentation on site.

1.15 TRAINING

- .1 Use only skilled workers on Work Site who are deemed competent and are trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.
- .3 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .4 When unforeseen or peculiar safety-related 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 Departmental Representative verbally and in writing.

1.16 MINIMUM SITE SAFETY RULES

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; the company shall establish rules to govern the conduct and actions of their employees. These rules should leave no room for discretion and argument. The rules must be enforced and action should be taken every time a rule is violated.
- .2 Brief persons of the documented disciplinary protocols to be taken for noncompliance and post rules on site.

1.17 CORRECTION OF NON-COMPLIANCE

- .1 The constructor shall:
 - .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.18 INCIDENT REPORTING

- .1 Investigate and report all incidents to Departmental Representative.
- .2 Notify the Departmental representative as soon as reasonably practicable following the incident.
- .3 Ensure the Authority having Jurisdiction is notified as prescribed by applicable legislation.
- .4 Submit report in writing.

1.19 HAZARDOUS PRODUCTS

- .1 Not applicable.

1.20 BLASTING

- .1 Not applicable.

1.21 POWDER ACTUATED DEVICES

- .1 Not applicable.

1.22 CONFINED SPACES

- .1 Not applicable.

1.23 SITE RECORDS

- .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
- .2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.24 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in a conspicuous location on the Work Site in accordance with Acts and Regulations of Province. See local legislation for specifics.
- .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan.
 - .2 WHMIS data sheets.
 - .3 Lock out procedures.

END OF SECTION

1 General

1.1 REFERENCE STANDARDS

- .1 Contractor to Submit methods, means, and sequences for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.
- .2 Generally, provincial, territorial and municipal laws, regulations, bylaws and other requirements do not apply to federal lands, works or undertakings. Soil, sediment, water or other materials that are removed from federal lands may become subject to provincial, territorial or municipal laws and regulations.
- .3 Provincial, territorial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term "standards" is used in this part in order to maintain consistency in terminology throughout this document, and does not imply that standards contained in provincial, territorial or municipal laws and regulations apply on Federal lands, activities or undertakings.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 CLEANING AND DISPOSAL OF WASTE

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling and undertake construction practices in a manner which minimizes waste and optimizes construction materials.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 91 13 - General Commissioning Cx Requirements.

1.2 INSPECTION

- .1 Refer to GC 2.3.
- .2 Allow Departmental Representative 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.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .4 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.
- .5 Departmental Representative will order 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 Departmental Representative will pay cost of examination and replacement.

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

- .1 Notify appropriate agency Departmental Representative 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 orderly sequence to not cause delays 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 Refer to GC 2.4
- .2 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 Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly.
- .4 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.6 REPORTS

- .1 Submit two (2) copies of inspection and test reports to Departmental Representative

1.7 TESTS

- .1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
 - .1 Provide all necessary instruments, equipment and qualified personnel to perform tests.
- .2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00 – Closeout Submittals.
- .3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.
- .4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.
- .5 Project work will take place over several weekend shutdowns. Contractor to ensure that all equipment installed is completed, tested, inspected and commissioned before returning system over to client after each shutdown. (all phasing to be confirmed).

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 SITE ACCESS AND PARKING

- .1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.

1.2 BUILDING ACCESS

- .1 Use only access doors and circulation routes within building as designated by Departmental Representative to access interior work.

1.3 CONTRACTOR'S SITE OFFICE

- .1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.

1.4 MATERIAL STORAGE

- .1 Material storage space on site is limited does not exist. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

1.5 SANITARY FACILITIES

- .1 Sanitary facilities are available at the site and may be used by Contractor's work force. Make arrangements for the use of such facilities through the Departmental Representative.

1.6 POWER

- .1 Arrange, pay for and maintain temporary electrical power supply to supply power to the emergency board E1 during outages when utility power to the main switchboard must be interrupted.
- .2 Temporary power to be supplied via existing onsite 800 kW, 600V, 3 Phase, 4W generator.
- .3 Pay for all costs associated with generator monitoring and fuel during the duration of the project. Ensure that a local diesel mechanic is on call for operational and maintenance requirements and to deal with any breakdowns, faults, issues with the temporary generator during the complete shutdown process.
- .4 Provide and pay all costs to supply and install temporary cabling, 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 CSA C22.1-21 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in Section 01 35 29.06 – Health and Safety Requirements and to lockout requirements specified in Section 01 35 25 – Special Procedures on Lockout Requirements.
- .5 Coordinate with the facility manager and Departmental Representative to ensure that critical loads needed for the extended shutdown period are powered, specifically the buildings heating system.

1.7 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Departmental Representative.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 50 00 - Temporary Facilities and Controls.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 TEMPORARY POWER

- .1 Arrange, pay for and maintain temporary electrical power supply to supply power to the emergency board E1 during outages when utility power to the main switchboard must be interrupted.
- .2 Temporary power to be supplied via existing 800 kW, 600V, 3 Phase, 4W generator and automatic transfer switch. The generator temporary wiring and associated infrastructure to be supplied and installed by the Contractor and coordinated with the Departmental Representative. Provide mechanical protection for the temporary cabling or conduits.
- .3 Pay for all costs associated with setup, maintenance and fuel during the duration of the project. Ensure that a local diesel mechanic is on call for operational and maintenance requirements and to deal with any breakdowns, faults, issues with the temporary generator during the complete shutdown process.
- .4 Provide and pay all costs to supply and install temporary cabling, 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 CSA C22.1-21 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in Section 01 35 29.06 – Health and Safety Requirements and to lockout requirements specified in Section 01 35 25 – Special Procedures on Lockout Requirements.
- .5 A total of three (3) temporary power disruptions are anticipated which will disrupt power to a portion of facility.
 - .1 Partial disruption for measurement of switchgear for Cell #7 extension. Brief power disruption via opening of Tie Breaker and Main Breaker 'T1-N1' with existing generator active as currently connected.
 - .2 Partial disruption for extension of switchgear (Cell #7). Temporary brief power disruption via opening of Tie Breaker and Main Breaker 'T1-N1' with existing generator active as currently connected.
 - .3 Partial disruption for installation of new circuit breaker for active harmonic filter #2 in switchgear Cell #1. Temporary power disruption via opening of Tie Breaker and Main Breaker 'T2 - N2'. Bus No#1 to remain active under normal utility power with existing generator on standby.
- .6 Coordinate with the facility manager and Departmental Representative to ensure that critical loads needed for the extended shutdown period are powered, specifically the buildings heating system, network equipment and fire pumps.

1.4 TEMPORARY COMMUNICATION FACILITIES

- .1 Not applicable.

1.5 FIRE PROTECTION

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

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

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 Departmental Representative, submit following information for any materials and products proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Compliance to specified standards.
 - .5 Manufacturer's installation or application instructions.
 - .6 Evidence of arrangements to procure.
 - .7 Evidence of manufacturer delivery problems or unforeseen delays.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .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.

1.2 PRODUCT QUALITY

- .1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2 Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

- .1 Acceptable Materials: When materials specified include trade names or trademarks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.
- .2 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders.
- .3 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURERS INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions, so that Departmental Representative will designate which document is to be followed.

1.5 AVAILABILITY

- .1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.1.2 above.

1.6 WORKMANSHIP

- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.
- .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
- .4 Coordinate work between trades and subcontractors. See section 01 14 10 in this regard.
- .5 Coordinate placement of openings, sleeves and accessories.

1.7 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.
- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.
- .3 Keep exposed fastenings to minimum, space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.
- .5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard.

1.8 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.
- .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, use resilient washers with stainless steel.

1.9 STORAGE, HANDLING AND PROTECTION

- .1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.
- .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 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .6 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.
- .7 Immediately remove damaged or rejected materials from site.
- .8 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 - Summary of Work.

1.2 REFERENCE STANDARDS

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

1.3 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 Departmental Representative of impending installation and obtain approval for actual location.
- .4 Dimensional information and characteristics of existing switchgear to be obtained by Contractor and coordinated with Departmental Representative.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 RECORD DRAWINGS

- .1 Departmental Representative will provide two sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and accurately record deviations from contract documents caused by site conditions and changes ordered by Departmental Representative.
- .3 Mark changes in red coloured ink.
- .4 Record following information:
 - .1 Elevations of various elements in relation to Chart Datum.
 - .2 Field changes in dimensions and details.
 - .3 Changes made by Change Order.
- .5 At completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to Departmental Representative.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Waste Management and Disposal.
- .3 Section 26 05 00 - Common Work Results - Electrical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Efficiency, maintenance, or safety of operational elements.
 - .3 Visual qualities of sight-exposed elements.
 - .4 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 26 05 00 Common Work Results - Electrical.
- .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .12 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 MATERIALS

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 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 Provide on-site waste containers for collection of waste materials and debris.
- .3 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.
- .4 Remove waste materials, and debris from site on a daily basis.
- .5 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .6 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces resulting from the Work.
 - .1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Departmental Representative) and floor washing as necessary to thoroughly clean all soiled surfaces.
- .7 Remove snow and ice from access doors used by workforce.

1.4 FINAL CLEANING

- .1 In preparation for acceptance of the completed work perform final cleaning.
- .2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials, from interior and exterior finished surfaces. Clean and polish surfaces including baked enamel, plastic laminate, mechanical and electrical fixtures.
- .3 Replace items with broken pieces, scratches or disfigured.
- .4 Clean lighting reflectors, lenses, and other lighting surfaces.
- .5 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .6 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.
- .7 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.
- .8 Remove debris and surplus materials.

END OF SECTION

1 General

1.1 SUMMARY

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
 - .1 Preparation of a Construction Waste Management Plan that provides guidance on a logical progression of tasks and procedures to be followed in a pollution prevention program to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation.
 - .2 Preparation of monthly progress reports indicating cumulative totals representing progress towards achieving diversion and reduction goals of waste materials away from landfill and identifying any special programs, landfill options or alternatives to landfill used during construction.
- .2 Owner has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors be employed by the Contractor.

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM E 1609 01, Standard Guide for Development and Implementation of a Pollution Prevention Program
- .2 Recycling Certification Institute (RCI):
 - .1 RCI Certification Construction and Demolition Materials Recycling

1.3 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, repair and demolition operations.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non-hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.

- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings;
 - .2 Wood preservatives; strippers and household cleaners;
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Construction Waste Management Plan: A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.

1.5 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section
 - .1 Construction Waste Management Plan (CWM Plan): Submit a CWM Plan for this project prior to any waste removal from site.

1.6 QUALITY ASSURANCE

- .1 Resources for Development of Construction Waste Management Report (CWM Report): The following sources may be useful in developing the Draft Construction Waste Management Plan:
 - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
 - .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 (CWM PLAN) IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Owner, the Representative and other site personnel.
- .3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
 - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Owner, Contractor and Departmental Representative.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Administrative procedures preceding inspection and acceptance of Work by Departmental Representative.

1.2 RELATED SECTIONS

- .1 Section 01 78 00: Closeout Submittals.

1.3 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
 - .1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.
- .2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.
 - .1 Address defects, faults and outstanding items of work identified by such inspections.
 - .2 Advise Departmental Representative when all deficiencies identified have been rectified.
- .3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
 - .1 Project record as-built documents;
 - .2 Final Operations and Maintenance manuals;
 - .3 Maintenance materials, parts and tools;
 - .4 Compliance certificates from applicable authorities;
 - .5 Reports resulting from designated tests;
 - .6 Demonstration and training complete with user manuals;
 - .7 Manufacturer's Guarantee certificates.
 - .8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.
 - .9 Commissioning of equipment and systems specified.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Project Record Documents.
- .2 Operations and Maintenance data.

1.2 RELATED SECTIONS

- .1 Section 01 79 00: Demonstration and Training.

1.3 PROJECT RECORD DOCUMENTS

- .1 Departmental Representative will provide 2 white print sets of contract drawings and 2 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 Departmental Representative upon request.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
 - .2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
 - .3 Stamp all drawings with "As-Built". Label and place Contractor's signature and date.
 - .4 Show all modifications, substitutions and deviations from what is shown on the contract drawings.
 - .5 Record following information:
 - .1 Electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
 - .2 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
 - .3 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;
 - .4 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. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.
- .7 Submit on paper and in electronic format as pdf files. Forward pdf and in the native program format, MS Word, MS Excel, MS Project, Autocad dwg and photograph jpg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 REVIEWED SHOP DRAWINGS

- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.
- .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

1.5 OPERATIONS & MAINTENANCE MANUAL

- .1 O&M Manual - 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 one (1) interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
 - .2 Upon review and acceptance by Departmental Representative, submit three (3) final copies. Interim 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 Departmental Representative three (3) weeks prior to application for Certificate of Substantial Performance of the work.
- .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 following same numerical system as the section numbers of the Specification Manual.
 - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
 - .7 Type lists and notes. Do not hand write.
 - .8 Drawings, diagrams and manufacturers' literature must be legible. 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 product guarantees.
 - .7 Copy of approval documents and certificates issued by Inspection Authorities.
 - .8 Copy of reports and test results performed by Contractor as specified.

- .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data 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 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
 - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
 - .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.
- .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 Circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour 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.
 - .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 colour coded piping diagrams.
 - .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .13 Include test and balancing reports.
 - .14 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 colour and texture designations. Provide information for re-ordering custom manufactured products.
 - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

1.6 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 Departmental Representative.
- .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.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Procedures for demonstration and instruction of equipment and systems to Owner's O&M personnel.
- .2 O&M personnel includes property facility manager, building operators, maintenance staff, security staff and technical specialists, as applicable.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 91 13 - General Commissioning Cx Requirements

1.3 DESCRIPTION

- .1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative's personnel two (2) weeks prior to date of substantial performance.
- .2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.4 QUALITY CONTROL

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.
- .2 Submit training schedule of time and date for demonstration and training of each item of equipment and each system in accordance with the training plan four weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one (1) week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Report shall give time and date of each demonstration and training, with list of persons present.

1.5 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Section 01 45 00 - Quality Control.
- .2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 and equipment and systems are fully operational.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.6 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated O&M personnel are present.

1.7 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.

- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

1.8 TIME ALLOCATED FOR INSTRUCTIONS

- .1 Observe the allocated time period specified in trade sections. Provide additional time when required to ensure all personnel fully understand all aspects of the information and instructions being provided. Allow for questions by participants.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2 Acronyms:
 - .1 AFD - Alternate Forms of Delivery, service provider.
 - .2 BMM - Building Management Manual.
 - .3 Cx - Commissioning.
 - .4 EMCS - Energy Monitoring and Control Systems.
 - .5 O&M - Operation and Maintenance.
 - .6 PI - Product Information.
 - .7 PV - Performance Verification.
 - .8 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
 - .2 Ensure appropriate documentation is compiled into the BMM.
 - .3 Effectively train O&M staff.
- .2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
 - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
 - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

- .1 Cx to be a line item of Contractor's cost breakdown.
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility, modified switchgear, network monitoring system, breakers and harmonic filters is constructed and proven to operate satisfactorily under weather conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.
- .4 Departmental Representative will issue Certificate of Substantial Performance when:
 - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
 - .2 Equipment, components and systems have been commissioned.

- .3 O&M training has been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to Departmental Representative.
 - .1 Adequacy of provisions for Cx.
 - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
 - .3 Fully understand Cx requirements and procedures.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Departmental Representative.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00.
 - .1 Submit no later than four (4) weeks after award of Contract:
 - .1 Name of Contractor's Cx agent.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
 - .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least eight (8) weeks prior to start of Cx.
 - .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least eight (8) weeks prior to start of Cx.

- .4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING DOCUMENTATION

- .1 Departmental Representative to review and approve Cx documentation.
- .2 Provide completed and approved Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.16.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
 - .1 Approval of Cx reports.
 - .2 Verification of reported results.
 - .3 Repairs, retesting, re-commissioning, re-verification.
 - .4 Training.

1.10 COMMISSIONING MEETINGS

- .1 Convene Cx meetings following project meetings: Section 01 32 16.16 and as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 60% construction completion stage (Just prior to installation of first harmonic filter). Section 01 32 16.16. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
 - .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
 - .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
- .5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .6 Meeting will be chaired by Departmental Representative, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.11 STARTING AND TESTING

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.12 WITNESSING OF STARTING AND TESTING

- .1 Provide fourteen (14) days notice prior to commencement.
- .2 Departmental Representative to witness of start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.13 MANUFACTURER'S INVOLVEMENT

- .1 Factory testing: manufacturer to:
 - .1 Coordinate time and location of testing.

- .2 Provide testing documentation for approval by Departmental Representative.
- .3 Arrange for Departmental Representative to witness tests.
- .4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative.
 - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
 - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
 - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
 - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
 - .1 Experienced in design, installation and operation of equipment and systems.
 - .2 Ability to interpret test results accurately.
 - .3 To report results in clear, concise, logical manner.

1.14 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up procedures.
 - .3 Operational testing: document equipment performance.
 - .4 System PV: include repetition of tests after correcting deficiencies.
 - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document require tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
 - .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
 - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
 - .1 Rejected equipment to be remove from site and replace with new.
 - .2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

- .1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.
- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.

- .2 Pre-start-up inspection reports.
- .3 Signed installation/start-up check lists.
- .4 Start-up reports,
- .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.17 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.18 START OF COMMISSIONING

- .1 Notify Departmental Representative at least twenty-one (21) days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.19 INSTRUMENTS/EQUIPMENT

- .1 Submit to Departmental Representative for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
 - .1 2-way radios.
 - .2 Ladders.
 - .3 Equipment as required to complete work.

1.20 COMMISSIONING PERFORMANCE VERIFICATION

- .1 Carry out Cx:
 - .1 Under actual operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 Provide all supporting documentation for performance verification.

1.21 WITNESSING COMMISSIONING

- .1 Departmental Representative to witness activities and verify results.

1.22 AUTHORITIES HAVING JURISDICTION

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Departmental Representative within five (5) days of test and with Cx report.

1.23 EXTENT OF VERIFICATION

- .1 Provide manpower and instrumentation to verify reported results, unless specified otherwise in other sections.
- .2 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
- .3 Perform additional and/or repeat commissioning until results are acceptable to Departmental Representative.

1.24 REPEAT VERIFICATIONS

- .1 Assume costs incurred by Departmental Representative for subsequent verifications where:
 - .1 Verification of reported results fail to receive manufacturers sign off, Departmental Representative's approval.
 - .2 Repetition of second verification again fails to receive approval.
 - .3 Departmental Representative deems Contractor's request for second verification was premature.

1.25 SUNDRY CHECKS AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.26 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.
- .2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.27 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.28 ACTIVITIES UPON COMPLETION OF COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.29 TRAINING

- .1 In accordance with Section 01 79 00

1.30 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.31 OCCUPANCY

- .1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.
- .2 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with Departmental Representative.
- .3 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.32 PERFORMANCE VERIFICATION TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/-10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
 - .1 Unless otherwise specified actual values to be within +/-2% of recorded values.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Description of overall structure of Plan and roles and responsibilities of commissioning team.
- .2 Related Requirements
 - .1 Section 01 91 13 - General Commissioning Cx Requirements.

1.2 GENERAL

- .1 Provide a fully functional:
 - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
 - .2 O&M personnel have been fully trained in aspects of installed systems.
 - .3 Optimized life cycle costs.
 - .4 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
 - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
 - .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
 - .3 Sets out deliverables relating to O&M, process and administration of Cx.
 - .4 Describes process of verification of how built works meet design requirements.
 - .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
 - .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Cx.
 - .2 General description of elements that make up Cx Plan.
 - .3 Process and methodology for successful Cx.
- .4 Acronyms:
 - .1 Cx - Commissioning.
 - .2 BMM - Building Management Manual.
 - .3 EMCS - Energy Monitoring and Control Systems.
 - .4 MSDS - Material Safety Data Sheets.
 - .5 PI - Product Information.
 - .6 PV - Performance Verification.
 - .7 TAB - Testing, Adjusting and Balancing.
 - .8 WHMIS - Workplace Hazardous Materials Information System.
- .5 Commissioning terms used in this Section:
 - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
 - .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.3 DEVELOPMENT OF FINAL CX PLAN

- .1 Cx Plan to be 95% completed before added into Project Specifications.
- .2 Cx Plan to be 100% completed within eight (8) weeks of award of contract to take into account:
 - .1 Approved shop drawings and product data.

- .2 Approved changes to contract.
- .3 Contractor's project schedule.
- .4 Cx schedule.
- .5 Contractor's, sub-contractor's, suppliers' requirements.
- .6 Project construction team's and Cx team's requirements.
- .3 Submit completed Cx Plan to Departmental Representative and obtain written approval.

1.4 REFINEMENT OF CX PLAN

- .1 During construction phase, revise, refine and update Cx Plan to include:
 - .1 Changes resulting from Client program modifications.
 - .2 Approved design and construction changes.
- .2 Revise, refine and update every weeks during construction phase. At each revision, indicate revision number and date.
- .3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.5 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

- .1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
- .2 Project Manager will select Cx Team consisting of following members:
 - .1 PWGSC Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.
 - .2 PWGSC Quality Assurance Commissioning Manager: ensures Cx activities are carried out to ensure delivery of a fully operational project including:
 - .1 Review of Cx documentation from operational perspective.
 - .2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
 - .3 Protection of health, safety and comfort of occupants and O&M personnel.
 - .4 Monitoring of Cx activities, training, development of Cx documentation.
 - .5 Work closely with members of Cx Team.
 - .3 Departmental Representative is responsible for:
 - .1 Organizing Cx.
 - .2 Monitoring operations Cx activities.
 - .3 Witnessing, certifying accuracy of reported results.
 - .4 Witnessing and certifying TAB and other tests.
 - .5 Developing BMM.
 - .6 Ensuring implementation of final Cx Plan.
 - .7 Performing verification of performance of installed systems and equipment.
 - .8 Implementation of Training Plan.
 - .4 Construction Team: contractor, subcontractors, suppliers and support disciplines, is responsible for construction/installation in accordance with Contract Documents, including:
 - .1 Testing.
 - .2 Performance of Cx activities.
 - .3 Delivery of training and Cx documentation.
 - .4 Assigning one person as point of contact with Consultant and PWGSC Cx Manager for administrative and coordination purposes.
 - .5 Contractor's Cx agent implements specified Cx activities including:
 - .1 Demonstrations.
 - .2 Training.

- .3 Testing.
- .4 Preparation, submission of test reports.
- .6 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:
 - .1 Receiving facility.
 - .2 Day-To-Day operation and maintenance of facility.

1.6 CX PARTICIPANTS

- .1 Employ the following Cx participants to verify performance of equipment and systems:
 - .1 Installation contractor/subcontractor:
 - .1 Equipment and systems except as noted.
 - .2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
 - .1 To include performance verification.
 - .3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.
 - .4 Specialist Cx agency:
 - .1 Possessing specialist qualifications and installations providing environments essential to client's program but are outside scope or expertise of Cx specialists on this project.
 - .5 Client: responsible for intrusion and access security systems.
 - .6 Ensure that Cx participant:
 - .1 Could complete work within scheduled time frame.
 - .2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:
 - .1 Modify optimization setpoints to meet changes in facility load profile.
 - .2 Supply of trending data to validate that each harmonic filter has been set and is functioning best to suit the application.
 - .7 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx three (3) months prior to starting date of Cx for review and approval.

1.7 EXTENT OF CX

- .1 Commission electrical systems and equipment.
 - .1 Switchboard:
 - .1 Clean interior enclosure - blow out dust and dirt using a vacuum cleaner. Clean faces of instruments and viewing windows. Remove dust from all insulators and insulation.
 - .2 Check for heat damaged connections, loose wires and other defects. All repairs / tightening of hardware shall be performed using a calibrated torque wrench following manufacture's guidelines. In the absence of the manufacture's guidelines Table D6 of the Canadian Electrical Code can be utilized.
 - .3 Inspect bolted electrical connections for heating signs. Suspected heating connections shall be tested for high resistance using either a low-resistance ohmmeter or calibrated torque wrench as per manufacturer's instructions. All repairs / tightening of hardware shall be performed using a calibrated torque wrench following manufacture's guidelines. In the absence of the manufacture's guidelines Table D6 of the Canadian Electrical Code can be utilized.
 - .4 Check to ensure solid, vibration-free mounting.
 - .5 Check cover or door installation and locking device.
 - .6 Check security of conduits and fittings attached to enclosure.

- .7 Check the grounding.
- .8 Check instrument and control switches and inspect their contacts.
- .9 Examine all indicating lamps and replace as required.
- .10 Check terminal block contacts for loose connections.
- .11 Check for proper condition of instrument transformers. Replace burned out fuses, if any. Check primary and secondary connections.
- .12 Examine all safety interlocks for correct operation.
- .13 Inspect cable connections. All repairs / tightening of hardware shall be performed using a calibrated torque wrench following manufacture's guidelines. In the absence of the manufacture's guidelines Table D6 of the Canadian Electrical Code can be utilized.
- .14 Operate all control switches 3 times.
- .15 Ensure over current devices are correct sizes for both the anticipated load and short circuit potential.
- .16 Lubricate mechanisms, contacts, and other moving components.
- .17 Check for proper identification and update panel directory, tags, and single line drawings. Check for proper identification and up-to-date directory on panel.
- .18 Test and calibrate all meters, transducers and protective relays associated with the system.
- .19 After the equipment has been returned to service check the voltage and amperage on the primary wires.
- .2 Breakers:
 - .1 Remove interphase barriers and clean them and all other insulating surfaces with dry compressed air (or nitrogen gas), a vacuum cleaner, or clean lint-free rags and solvents as recommended by the manufacturer, to remove hardened or encrusted contamination.
 - .2 Inspect insulators and insulating materials for cracks, breaks and overheating. Check for electric distress, signs of corona, tracking and thermal damage as described in article 6-2.10 through 6-2.14 of NFPA 70B.
 - .3 Manually close the circuit breaker to check for proper wipe, pressure, contact alignment, and assure that all contacts are made at approximately at the same time. Check to spacing between stationary and movable contacts in the fully open position. Make all final adjustments in accordance with manufacturer's instructions.
 - .4 Check interrupts for broken or cracked ceramic parts, erosion of ceramics and dirt in interrupter. Some manufacturers also recommend a surface dielectric test of the ceramic surfaces near the contacts.
 - .5 Check air puffer devices and arc chutes or splitter plates for erosion, and
 - .6 Inspect operating mechanism for loose or broken parts; missing cotter pins or retaining keepers; missing nuts and bolts; and for binding or excessive wear. Ensure that the closing and tripping action is quick and positive, and correct binding or delays prior to returning to service.
 - .7 Inspect the closing motor or solenoid, shunt trip, auxiliary switches, and bell alarm switch for correct operation, insulation condition, and tightness of connections.
 - .8 Check on-off indicators, spring-charge indicators, mechanical and electrical interlocks, key interlocks, and padlocking fixtures for proper operation, and lubricate where required.

- .9 Check for general condition and tightness of current transformer, connection bolts, frame, fuses and mountings, and frame grounding devices. All repairs / tightening of hardware shall be performed using a calibrated torque wrench following manufacture's guidelines. In the absence of the manufacture's guidelines Table D6 of the Canadian Electrical Code can be utilized.
- .10 Exercise the circuit breaker through several close-open cycles. For electrically operated circuit breakers, operate the circuit breaker electrically. Examine the operation of the circuit breaker during these operations for any evidence of difficulty, erratic operation, etc.
- .11 Perform and record results of insulation resistance (megger test) following the manufactures recommended test voltage level measure line to load insulation resistance of each phase with breaker open. Close breaker and measure phase to phase and phase to ground insulation resistance.
- .12 Perform and record results of insulation resistance test on control wiring. Following the manufacturers recommended test voltage level measure the insulation resistance of each secondary terminal connection to ground, with breaker open and closed.
- .13 Perform and record results of contact resistance test on main contacts.
- .14 Perform and record results of secondary injection testing on the protective tripping system, using methods approved by the manufacturer.
- .3 Active Harmonic Filters.

1.8 START-UP

- .1 Start up components, equipment and systems.
- .2 Equipment manufacturer, supplier, installing specialist sub-contractor, as appropriate, to start-up, under Contractor's direction, following equipment, systems:
 - .1 Modified switchgear.
 - .2 Active harmonic filter.
- .3 Departmental Representative to monitor all of these start-up activities.
 - .1 Rectify start-up deficiencies to satisfaction of Departmental Representative .
- .4 Performance Verification (PV):
 - .1 Approved Cx Agent to perform.
 - .2 Use procedures modified generic procedures to suit project requirements.
 - .3 Departmental Representative to witness and certify reported results using approved PI and PV forms.
 - .4 Departmental Representative to approve completed PV reports and provide to Consultant.

1.9 CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Perform Cx by specified Cx agency using procedures developed by Contractor and approved by Departmental Representative .
- .2 Departmental Representative to monitor Cx activities.
- .3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.
- .4 Departmental Representative to witness, certify reported results of, Cx activities and forward to Consultant.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

1.10 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

- .1 Cx to be performed by specified Cx specialist, using procedures developed by Contractor and approved by Departmental Representative .

- .2 Tests to be witnessed by Departmental Representative and documented on approved report forms.
- .3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Contractor and submitted to Departmental Representative for review.
- .4 Departmental Representative reserves right to verify percentage of reported results.
- .5 Integrated systems to include:
 - .1 Fire alarm systems.
 - .2 Fire pumps and controllers.
 - .3 Power monitoring network.
 - .4 Emergency power generator.
 - .5 Transfer switch and controllers.
 - .6 Emergency lighting systems.
 - .7 Active harmonic filters.
- .6 Identification:
 - .1 In later stages of Cx, before hand-over and acceptance Contractor and Cx Manager to co-operate to complete inventory data sheets and provide assistance to PWGSC in full implementation of MMS identification system of components, equipment, sub-systems, systems.

1.11 INSTALLATION CHECK LISTS (ICL)

- .1 Refer to Section 01 91 13.16- Commissioning Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.12 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Refer to Section 01 91 13.16- Commissioning Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.13 PERFORMANCE VERIFICATION (PV) REPORT

- .1 Refer to Section 01 91 13.16- Commissioning Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.14 CX SCHEDULES

- .1 Prepare detailed Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
 - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
 - .1 Design criteria, design intents.
 - .2 Pre-TAB review: twenty-eight (28) days after contract award, and before construction starts.
 - .3 Cx agents' credentials: sixty (60) days before start of Cx.
 - .4 Cx procedures: two (2) months after award of contract.
 - .5 Cx Report format: three (3) months after contract award.
 - .6 Submission of list of instrumentation with relevant certificates: twenty-one (21) days before start of Cx.
 - .7 Notification of intention to start TAB: twenty-one (21) days before start of TAB.
 - .8 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
 - .9 Notification of intention to start Cx: fourteen (14) days before start of Cx.

- .10 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed fourteen (14) days before start of integrated system Cx.
- .11 Identification of deferred Cx.
- .12 Implementation of training plans.
- .13 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Departmental Representative .
- .3 Six (6) months in Cx schedule for verification of performance.
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Consultant, Contractor, Contractor's Cx agent, and Departmental Representative will monitor progress of Cx against this schedule.

1.15 CX REPORTS

- .1 Submit reports of tests, witnessed and certified by Cx Team who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Departmental Representative.

1.16 ACTIVITIES DURING WARRANTY PERIOD

- .1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
 - .1 Fine tuning of HVAC systems.
 - .2 Adjustment of ventilation rates to promote good indoor air quality and reduce deleterious effects of VOCs generated by off-gassing from construction materials and furnishings.

1.17 TESTS TO BE PERFORMED BY OWNER/USER

- .1 None is anticipated on this project.

1.18 FINAL SETTINGS

- .1 Upon completion of Cx to satisfaction of Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Commissioning forms to be completed for equipment, system and integrated system.
- .2 Related Requirements
 - .1 Section 01 91 13.13 - Commissioning Plan

1.2 INSTALLATION/START-UP CHECK LISTS

- .1 Include the following data:
 - .1 Product manufacturer's installation instructions and recommended checks.
 - .2 Special procedures as specified in relevant technical sections.
 - .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.
- .3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
- .4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.
- .5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

- .1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.
- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative's approval.

1.5 COMMISSIONING FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Manufacturer's Commissioning Agent will provide Contractor project-specific Commissioning forms with Specification data included.

- .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
- .3 Confirm operation as per design criteria and intent.
- .4 Identify variances between design and operation and reasons for variances.
- .5 Verify operation in specified normal and emergency modes and under specified load conditions.
- .6 Record analytical and substantiating data.
- .7 Verify reported results.
- .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative.
- .9 Submit immediately after tests are performed.
- .10 Reported results in true measured SI unit values.
- .11 Provide Departmental Representative with originals of completed forms.
- .12 Maintain copy on site during start-up, testing and commissioning period.
- .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual.

1.6 LANGUAGE

- .1 English.

2 Products

2.1 NOT USED

- .1 Not Used.

3 Execution

3.1 NOT USED

- .1 Not Used.

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 Motors, electric heating, 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.
- .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 installed electrical systems and instrumentation.
 - .3 Upon completion of work, submit load balance report as described in PART 3 - LOAD BALANCE.
 - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of work to Consultant.
- .6 Project scope related to the retrofit of the switchgear to be performed by factory trained technicians.

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 and maximum usable space.
- .3 Contractor to locate all existing services before commencing work and be responsible for any damages caused by failure to coordinate with and preserve existing 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 by site measurements. Follow the Electrical Drawings for laying out the work.

1.10 CUTTING AND PATCHING

- .1 Electrical Contractor to inform Departmental Representative 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 Departmental Representative.

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 schedule 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 and work activities must be coordinated to maintain electrical services throughout the building. 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 48 hours in advance.
- .6 All power shutdowns which affect building occupants or building operation must have prior approval of the Departmental Representative and must be scheduled in writing at least 14 days in advance with the building maintenance superintendent. Power shutdowns must occur between the hours of 01:00AM Saturday to 11:00PM Sunday. It is anticipated that the work will need to be completed over several shutdowns.
- .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.

1.15 ESSENTIAL SERVICES

- .1 Electrical and communication services including fire alarm, emergency and exit lighting, are considered essential services and must be maintained in operation at all times.
- .2 Should interruptions to these services be deemed absolutely necessary they must be approved and scheduled in writing with the Departmental Representative at least 14 days in advance.
- .3 Interruptions must be taken when acceptable to the Departmental Representative and may include weekday and weekend nights.
- .4 If an interruption in an essential service is taken, work must progress continuously until the service is restored.
- .5 Interruptions may be cancelled by the Departmental Representative at any time either prior to or during should an emergency arise. Any work must be immediately aborted and systems returned to full operating state.

2 Products

2.1 PRIOR APPROVAL OF PRODUCTS

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

2.2 MATERIALS AND EQUIPMENT

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

2.3 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.
 - .2 Paint indoor electrical equipment enclosures light grey to EEMAC 2Y-1.

2.4 WARNING SIGNS

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

2.5 WIRING TERMINATIONS

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

2.6 EQUIPMENT IDENTIFICATION

- .1 All junction and pull boxes 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	Dimensions	Lines	Letter Height
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 Nameplates for pull boxes, splitters and panelboards to indicate system name, overcurrent protection device rating, voltage, phase, and number of wire, and power source.
- .10 Nameplate for transformers to indicate capacity, primary and secondary voltages and transformer number.
- .11 Lamicoid nameplate installed on panelboards and splitter troughs shall indicate the following:
 - .1 Designated name of equipment.
 - .2 Voltage, number of phases and wires.
 - .3 Designation of power source.
 - .4 The following is an example:

ACTIVE HARMONIC FILTER #1
FED FROM SERVICE ENTRANCE SWITCHGEAR 'N2-F4' (CELL 1)

- .12 Lamicoid nameplates installed on all various system circuit breakers 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:

FEEDER N2-F4 AHF #2
800 AF / 400 AT

- .13 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
--	--

2.7 WIRING IDENTIFICATION

- .1 Identify wiring with indelible pre-printed self-adhesive vinyl tape, indicating panel and circuit number. Wiring to be identified at both ends and at junction, pull boxes and splices.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1-21, Canadian Electrical Code.

2.8 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	White
Data	Blue	-----

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 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.5 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program will be permitted, under the direct supervision of a qualified licensed electrician.
 - .1 Permitted activities are to be determined based on the level of training attained and the demonstration of ability to perform specific duties.

- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.
- .3 Load Balance:
 - .1 Measure phase current to equipment with normal loads operating at time of acceptance. Adjust circuit connections and setpoints as required to obtain best balance of current between phases and record changes.
 - .2 Submit, at completion of work, report listing phase and neutral currents on equipment operating under normal load. State hour and date on which each load was measured, and voltage at time of test.
- .4 Conduct and pay for following tests in accordance with Division 01 - General Requirements.
 - .1 Distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Exit sign and emergency lighting.
 - .5 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.
 - .6 Systems: fire alarm system, communications.
 - .7 Ground system continuity and resistance test.
- .5 Furnish active harmonic filters manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .6 Insulation resistance testing for:
 - .1 Megger and record circuits, incoming service feeders and wiring to distribution panels up to 350 V with a 500 V instrument.
 - .2 Megger and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing and record value.
- .7 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

3.6 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 trays, cables, enclosures, etc. upon completion of construction.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 C22.1-21, Canadian Electrical Code (CEC), Part 1.
 - .2 Z462-18, Workplace Electrical Safety.

1.3 DESCRIPTION OF WORK

- .1 Installation of new draw out circuit breakers, metering, current and potential transformers, associated controls and extension of new distribution cell c/w installed bussing off the main switchgear.
- .2 All alteration work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code and CSA Z462.
- .3 Supply of power to the switchboard via onsite existing diesel standby generator during power outages needed to accomplish the work on the main switchboard and provide power to distribution on other side of tie-breaker. Temporary power to be supplied via the existing 800 kW, 600V, 3 Phase, 4W generator.
- .4 Site of Work is at: Summerside Taxation Centre, 275 Pope Road, Summerside PE.
- .5 Provide and pay all costs to supply and install temporary cabling, 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 CSA C22.1-21 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in Section 01 35 29.06 – Health and Safety Requirements and to lockout requirements specified in Section 01 35 25 – Special Procedures on Lockout Requirements.

1.4 SITE SURVEY

- .1 Prior to Tender submission, visit the site and survey and quantify the extent of the 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 electrical drawings and include all costs due to existing conditions in total tendered price.
- .3 To support project scope activities a power shutdown will be required in order to allow the manufacturer an opportunity to inspect the interior of the switchboard and gather any necessary information needed for the retrofit. The manufacturer is to ensure that the cost for this visit is included in the tender submission and note that the shutdown can only occur between the hours of Saturday 1:00 AM and Sunday at 11:00 PM.

1.5 PROTECTION

- .1 Protect existing equipment from debris, dust and environmental conditions.
- .2 The Contractor is responsible for any damages to existing structure or services as a result of the work.

1.6 SALVAGE MATERIAL

- .1 Prior to demolition Departmental Representative will identify any items or equipment which is to be set aside as directed for future use. In general, this will include all components that may be able to be reused at the facility or elsewhere.
- .2 All other materials and equipment removed under work of this Section becomes the property of the Contractor for disposal off the property.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.
- .2 Remove from site and dispose of all materials at appropriate recycling facilities.
- .3 Collect and separate packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Comply with all Federal, Provincial and Municipal laws and regulations when disposing of waste.

2 Part 2 Products

2.1 NOT APPLICABLE

3 Part 3 Execution

3.1 GENERAL REMOVALS

- .1 Remove all obsolete or abandoned electrical equipment and materials including wire and conduit, except those designated for reuse.
- .2 Remove services associated with obsolete or abandoned mechanical systems.
- .3 Schedule all removal work with the Departmental Representative. 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 CEC. 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 or as required to meet current standards, to be included in total tendered price.

3.2 CUTTING AND SEALING

- .1 Cutting required for removals and alterations to be to the approval of the Departmental Representative and performed with appropriate power tools. Penetrations through enclosures shall utilize tight connectors complete with gasket.

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 conductors.
 - .3 Stud clamp bolts for copper 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 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 Install crimp style connectors with snap-on nylon caps on splices and joints on branch circuits.
- .2 All connections are to be made electrically and mechanically secure. Size and type of connector to be in accordance with manufacturers recommendations for each wire size and combination of wires.

3.2 RESTRICTIONS

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

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors (0-1000V).
- .3 Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .5 Section 26 05 36 - Cable Trays for Electrical Systems.

1.2 REFERENCES

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

2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for #8 AWG and larger, 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.
- .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.
- .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.

2.2 TECK CABLE

- .1 Cable: to CAN/CSA C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, 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 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.

3 Execution

3.1 WIRING METHODS

- .1 All work in or through fire rated or acoustic structures to be in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Branch circuit work:
 - .1 Building wire in conduit or armoured cable.
 - .2 Armoured cable may be used where permitted by the Canadian Electrical Code for drops to relocated lights.
- .3 Drops to light fixtures to be building wire in flexible conduit or armoured cable, maximum length 1.5 m.
- .4 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 Lay cable in cable trays in accordance with Section 26 05 36 - Cable Trays for Electrical Systems.
- .2 Support cables in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .3 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0-1000 V).
- .4 Cable Colour Coding: to Section 26 05 00 - Common Work Results - Electrical.
- .5 Conductor length for parallel feeders to be identical.
- .6 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .7 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 cable trays in accordance with Section 26 05 36 - Cable Trays for Electrical Systems.

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

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 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .2 Insulated grounding conductors: green, type RW90, copper, size as indicated.
- .3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors, as required by local authority having jurisdiction.
 - .4 Bonding jumpers, straps.
 - .5 Pressure wire connectors.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Connect new electrical infrastructure to existing grounding system to provide a complete permanent, continuous grounding system including, conductors, connectors, and accessories.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 Install a bonding wire in all conduits. Where EMT is used, run insulated copper bond wire in conduit.
- .7 Install internal bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.
- .8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .9 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

3.2 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Switchgear, control panels, distribution panels, active harmonic filters, etc.

3.3 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 from 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.

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.

END OF SECTION

1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
 - .2 CSA C22.2 No. 18.3-12, Conduit, Tubing, and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 & UL 514B).
 - .3 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 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with steel set-screw couplings and connectors.

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 FISH CORD

- .1 Polypropylene.

2.5 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 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.
- .6 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.
- .7 Use AC-90 for vertical power supply drops to luminaires.
- .8 Minimum conduit size for lighting and power circuits: 21 mm. 16 mm conduit is acceptable for switch leg drops and control circuits only.
- .9 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .10 Mechanically bend steel conduit over 21 mm dia.
- .11 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .12 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

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

3.4 CLEANING

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

END OF SECTION

1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.1-21 No. 126.1 – Metal Cable Tray Systems.
- .2 National Electrical Manufacturers Association (NEMA).
 - .1 NEMA VE1, Metal Cable Tray Systems.
- .3 American National Standards Institute (ANSI).
 - .1 ANSI/TIA-569-E, Telecommunications Pathways and Spaces.

1.3 SUBMITTALS

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

2 Products

2.1 METALLIC LADDER TRAY

- .1 Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.
- .2 Materials and Finish: Material and finish specifications for each ladder tray is as follows:
 - .1 Hot-dip Galvanized Steel: Straight section and fitting side rails and rungs shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33, Type 2 for 16 gauge and lighter, and shall be hot-dip galvanized after fabrication in accordance with ASTM A123. All covers and splice plates must also be hot-dip galvanized after fabrication; mill galvanized covers are not acceptable for hot-dipped galvanized cable tray. All hot-dip galvanized after fabrication steel cable trays must be returned to point of manufacture after coating for inspection and removal of all icicles and excess zinc. Failure to do so can cause damage to cables and/or injury to installers.
 - .2 Ladder type trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced 450mm on center. Spacing in radiused fittings shall be 450mm and measured at the center of the tray's width. Rungs shall have a minimum cable-bearing surface of 21mm with radiused edges. No portion of the rungs shall protrude below the bottom plane of the side rails.
 - .3 Tray Sizes shall have 100mm minimum usable load depth, or as noted on the drawing.
 - .4 Straight tray sections shall have side rails fabricated as I-Beams. All straight sections shall be supplied in standard 3m lengths, except where shorter lengths are permitted to facilitate tray assembly lengths as shown on drawings.
 - .5 Tray widths shall be 600mm or as shown on drawings.
 - .6 All fittings must have a minimum radius of 900mm.

- .7 Splice plates shall be the bolted type made as indicated below for each tray type.
The resistance of fixed splice connections between adjacent sections of tray shall not exceed .00033 ohms. Splice plate construction shall be such that a splice may be located anywhere within the support span without diminishing rated loading capacity of the cable tray.
 - .1 Steel (including Hot-dip galvanized) - Splice plates shall be manufactured of high strength steel, meeting the minimum mechanical properties of ASTM A1011 HSLAS, Grade 50, Class 1. Each splice plate shall be attached with four ribbed neck carriage bolts with serrated flange locknuts. Hardware shall be in accordance with ASTM F-1136-88 for hot-dip galvanized cable trays.
- .8 Ladder Tray Supports: Shall be placed so that the support spans do not exceed maximum span indicated on drawings. Supports shall be constructed from 12 gauge steel formed shape channel members 35mm x 35mm with necessary hardware such as Trapeze Support Kits. Cable trays installed adjacent to walls shall be supported on wall mounted brackets.
- .9 Trapeze hangers and center-hung supports shall be supported by 16mm inch (minimum) diameter rods.
- .10 Barrier Strips: Shall be placed as specified on drawings and be fastened into the tray with self-drilling screws.
- .11 Accessories - special accessories shall be furnished as required to protect, support, and install a cable tray system. Accessories shall consist of but are not limited to; section splice plates, expansion plates, blind-end plates, specially designed ladder dropouts, barriers, etc.

2.2 SUPPORTS

- .1 Provide splices, supports, fasteners, etc. as required for a complete cable tray system. Supports to be designed to support trays for full loading in accordance with NEMA VE-1 with safety factor of 1.5.

3 Execution

3.1 INSTALLATION

- .1 Install complete cable tray system as indicated and as required. Install in accordance with NEMA VE-2.
- .2 Install strut style hangers using strut and threaded rod when suspended.
- .3 Support for tray to be at maximum 3m intervals if located $\frac{1}{4}$ span from coupling, otherwise maximum 1.5m spacing, in accordance with ANSI/TIA-569. Horizontal fittings to be supported at midpoint. Provide additional support for vertical tray and secure cables. Tray suspension to be trapeze style, unless indicated otherwise, consisting of 16mm galvanized threaded rod and galvanized steel channel.
- .4 Minimum vertical clearance from top of cable tray to all ceilings, heating ducts, etc. to be 300mm; and 150mm for short length obstructions.
- .5 Remove sharp burrs or projections to prevent damage to cables or injury to personnel.
- .6 Provide a continuous bare ground wire in each tray, sized in accordance with the Canadian Electrical Code, clamped at intervals of 10m. Terminate at source ground bus. Minimum size of #6 AWG.
- .7 Cable trays are to be installed at least 300mm away from light fixtures and must pass power cabling pathways at right angles.

3.2 CABLES IN CABLETROUGH

- .1 Install cables individually.

- .2 Lay cables into cabletrough. Use rollers when necessary to pull cables.
- .3 Secure cables in cabletrough at 7m centres, with velcro ties.
- .4 Identify cables every 30m with size 2 nameplates in accordance with Section 26 05 00 – Common Work Results - Electrical.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - General Requirements - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)

1.3 SUBMITTALS

- .1 Provide shop drawings and maintenance information in accordance with Division 01 - General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, installation instructions, specifications and datasheet and include product characteristics, performance criteria, and limitations.
- .3 Submit certified test results to Consultant.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

2 Products

2.1 ACTIVE HARMONIC FILTER

- .1 Active Harmonic Filter #1 and #2 characteristics:
 - .1 600 V, 3 phase, 60 Hz, 4 wire, 235A Rated.
 - .2 Enclosure: indoor enclosed, NEMA Type 2, free standing c/w sprinkler drip hood, top entry.
 - .3 Network voltage distortion: Max 20%, phase-to-phase up to 30th order.
 - .4 Voltage notch limits: Notch Depth: 10%, Notch Area to IEEE 519-2014 Annex C.
 - .5 Efficiency and losses: $\geq 97\%$, three-phase compensation ≤ 20 W/A.
 - .6 Current Transformer: Any ratio with 1A or 5A secondary, Class 1.0 accuracy, 3-CT's for 4-wire with neutral connected loads.
 - .7 Spectrum cancellation and selection: 2nd to 51st Harmonic Order, discrete, fully selectable adjustable per harmonic order.
 - .8 Unit to be c/w current control (target THD_2'), voltage control (THD_v) and reactive power factor control target.
 - .9 Filter performance: $THD_i < 3\%$ in closed loop control max 20:1 THD_i ; no less than 3% inductive impedance per non-linear load.
 - .10 Programmable leading and lagging PI correction with optimized or target PI.
 - .11 Selectable negative and zero sequence mains current load balancing.
 - .12 Paralleling compatible up to twelve (12) units in parallel per set of CT's.
 - .13 Filter shall analyze the content of the supply current for harmonics from the 2nd to the 51st harmonic and shall determine the reactive current content representing displacement power factor and current balancing.
 - .14 Over Protection Device: The circuit breaker must be rated for at least 125% of the rated load current: 400A (80%) rated circuit breaker.
 - .15 Current Transformers: Qty 4 – CTs 3000: 5A main split core shall be provided, 400 Hertz bandwidth per.
 - .1 Additional CTs to be installed at the tie breakers.

2.2 FINISH

- .1 Apply finishes in accordance with Section 26 05 00 - Common Work Results for Electrical.

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 and connect Active Harmonic Filter.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Carry out following tests by manufacturer within 24 hours of energizing equipment:
 - .1 Visual and Mechanical Inspection:
 - .1 General install and appearance of entire unit and components, cooling vents, enclosure type, environmental and clearance requirements, conductor sizing, grounding.
 - .2 Document equipment nameplate.
 - .3 Confirm that CT's are shorted.
 - .4 Verify that components installed correspond to BOM and actual application.
 - .5 Verify mechanical and electrical terminations of all power and control wiring.
 - .2 Pre-Energized Electrical Checks:
 - .1 Confirm over-current protection, control and power fuses.
 - .2 Check and correct operating position of breakers, fuses etc prior to insulation testing.
 - .3 Complete insulation resistance checks phase-phase and phase-ground (1000Vdc).
 - .3 Energized Electrical tests:
 - .1 Confirm voltage levels.
 - .2 Confirm Power Factor controller programming and setup, or HMI setup and commissioning.
 - .3 Document settings and complete test sheets as required.
 - .4 Complete performance check of control functions including contactors, thermal relay trip operation, fans, over temperature protection.
 - .5 Check capacitor stage currents, document and record in computer.
 - .6 Open CT shorting and confirm automatic PF controller operation and load tracking, CT setup.
 - .4 Remote Supervision:
 - .1 A manufacturer certified technician is to provide on site supervision during startup of the AccuSine.
- .3 Provide certified test results to Consultant.

- .4 Contractor to verify that existing power factor capacitors are not present downstream of the selected CT location. Capacitors downstream of the CTs must be removed or additional CTs must be installed ahead of the capacitor to remove its contribution from the main CTs. Filter and power factor correction performance will be diminished greatly and/or resonance may occur. Nonlinear loads with input EMI or RFI filters may interact with filter and power factor correction to prevent proper operation. Removal of these filters is best. However, if removal is not possible, insertion of a 3% series line reactor in front of the EMI filter is required. PWM VFDs require either a 5% DC bus choke or a 3% input line reactor for operation with filter and power factor correction. Failure to follow any of these guidelines may result in substandard performance of filter and power factor correction or an inability to successfully commission filter and power factor correction.

3.4 CLEANING

- .1 Proceed in accordance with Section 26 05 00 - Common Work Results for Electrical.
.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

