Regional District of Nanaimo

Nanoose Water Service Area
SCADA Implementation

Tender No. 20-056

Project No. 9794-002-00

Mandatory Pre-Bid Meeting and Site Inspection:
Will begin Tuesday October 6th, 2020 at 9:00am local time
beginning at the Nanoose Water Treatment Plant
2480 Nanoose Road, Nanoose BC. Site visit will proceed from WTP to numerous sites
listed within the contract drawings and specifications.

Pre-registration for pre-bid meeting is required.
Submit intent to attend to:
zspencer@mpe.ca

Closing Location: gstpierre@rdn.bc.ca **via email before 3:00:00 pm local time, Thursday, October 15, 2020**

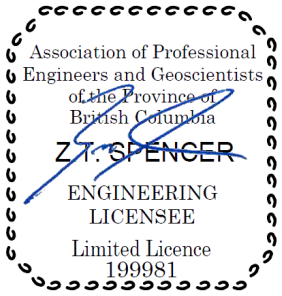
Tender Inquiries:
Zane Spencer, Eng. L. , (403) 382-8246
zspencer@mpe.ca

October 2020

Proud of Our Past... Building the Future

Regional District of Nanaimo

Nanoose Bay Water Service Area SCADA Implementation



2020-09-23

Prepared by MPE Engineering Ltd.

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PREAMBLE

The format of these Specifications is based on "MasterFormat" published jointly by Construction Specifications Canada and The Construction Specifications Institute. This Table of Contents generally reflects the "MasterFormat" division and section arrangement.

Where it is indicated that a division of "MasterFormat" is "Not Used", or where a division heading is omitted entirely, this means only that the division has not been included in the Specification. It does not necessarily mean that the work normally specified in that division is not required.

MasterFormat Broadscope Heading	Section Number	Section Title
DIVISION 0 – BIDDING REQUIREMENTS		
INSTRUCTION TO BIDDERS	00005	Certification Page
	00010	Table of Contents
	00030	Advertisement for Bids
	00200	Instructions to Bidders
	00210	Bid Security
	00250	Pre-Bid Meeting
BID FORM	00425	Unit Price Bid Form
BID FORM SUPPLEMENTS	00431	Schedule of Prices
	00491	Unit Price Bid Modification Form
DIVISION 0 – CONDITIONS OF CONTRACT		
AGREEMENT FORM	00525	Agreement Form
DEFINITIONS	00571	Definitions and Interpretation
BONDS	00612	Contract Performance Security
	00616	Security for Payment of Claims
CERTIFICATES	00625	Insurance Conditions
	00630	Payment Conditions
	00630A	Statutory Declaration Form
GENERAL CONDITIONS	00725	General Conditions
SUPPLEMENTARY CONDITIONS	00800	Supplementary Conditions

DIVISION 1 – GENERAL REQUIREMENTS

SUMMARY OF WORK	01110	Summary of Work
MEASUREMENT AND PAYMENT	01275	Measurement Rules
	01280	Measurement and Payment Schedule
MANAGEMENT AND COORDINATION	01311	Management and Co-ordination
CONTRACT MEETINGS	01312	Contract Meetings
SUBMITTALS	01322	Network Analysis Construction Schedule
	01330	Submittals
	01340	Shop Drawings, Product Data and Samples
ENVIRONMENTAL MANAGEMENT	01391	Environmental Protection
MANAGEMENT AND COORDINATION	01410	Regulatory Requirements
	01411	Work Site Safety
CONSTRUCTION FACILITIES	01586	Site Occupancy
PRODUCTS	01601	Products and Execution
	01621	Product Options and Substitutions
CONTRACT CLOSEOUT	01742	Final Clean-Up
	01775	Contract Acceptance Procedures
	01785	Contract Record Documents
	01790	Operation and Maintenance Manuals
	01795	Spare Parts and Maintenance Materials
	01810	Start-Up and Commissioning

DIVISION 13 – SPECIAL CONSTRUCTION

13310	Control and Instrumentation
13311	Instrumentation – Wiring
13312	Instrumentation – Field Instruments
13313	Instrumentation – Control Panels
13317	Programmable Logic Controllers and Computer Equipment
13318	Radio and SCADA Communications System

DIVISION 16 – ELECTRICAL

16005 Basic Electrical Requirements
16020 Existing Facilities
16050 Basic Materials and Methods
16711 Voice and Data Cabling
16712 Voice and Data Cabling Testing
16971 Electric Starting and Testing by Contractor

CONTRACT DRAWINGS – ISSUED SEPARATELY

END OF TABLE OF CONTENTS

Sealed Tenders clearly marked on the envelope as to contents will be received at gstpierre@rdn.bc.ca before **3:00 pm** local time, **Thursday, October 15, 2020** for the construction of:

REGIONAL DISTRICT OF NANAIMO
NANOOSE BAY WSA SCADA IMPLEMENTATION

The work included in this project is located in Nanoose Bay, British Columbia.

Major work items are as follows:

.1 Supply and Installation of SCADA Equipment at Water Stations

A mandatory general site visit will be held on October 06, 2020 starting at 9:00am at the Nanoose Bay Water Treatment Plant, 2480 Nanoose Rd, Nanoose, BC. All tenderers are required to attend this once only scheduled site inspection.

Each Tender must be accompanied by a bid bond in the amount of ten (10%) percent of the Tender Price, payable to the Regional District of Nanaimo.

Tenderers are also required to supply a Consent of Surety Form guaranteeing the required Performance Bond and Labour & Material Payment Bond will be provided should the contractor be awarded the project.

Specifications and Drawings will also be available for viewing online at BCBid at bcbid.gov.bc.ca.

The Owner reserves the right to waive informalities in, or reject any or all tenders, or accept the Tender deemed most favourable in the interest of the Owner.

Tenders will not be opened in public.

END OF SECTION

1. BID SUBMISSION

.1 Bidders must submit bids through email to gstpierre@rdn.bc.ca.

.2 Bidders may submit bids only before the time and date set by for receiving bids on the Owner's Email System.

.3 The time as indicated by the declining time clock on the Owner's Email System shall be the official time for closing. Bids submitted after the Owner's Email System closing time will not be accepted.

.4 Hard copy, oral, telephone, telegram, fax, or e-mail bids will not be accepted nor acknowledged.

.5 The foregoing states the date and time before which bids will be received hereinafter called the "bid closing time".

.6 Bids shall be prepared and submitted and the bidding process will be administered in accordance with these bidding requirements.

2. SUMMARY

.1 The intent of this bid call is to solicit and receive formal offers for:

Regional District of Nanaimo – Nanoose WSA SCADA Implementation

.2 Refer to Section 01110 - Summary of Work for a summary of the Project, including requirements pertaining to Contract Time.

3. BASIS OF BID - UNIT PRICE

.1 Bids shall be on a unit price basis.

.2 The unit prices, lump sums and allowances stated in the Bid Form and Schedule of Prices shall form the basis of the bid price.

.3 Make entries in the Bid Form and Schedule of Prices in figures only. Ensure that figures are legible.

.4 Where, in the Owner's opinion, there is a question as to the legibility of figures entered by the Bidder, the Owner will make a determination as to legibility. The Owner may, at the Owner's sole discretion, declare as invalid and reject any bid that contains figures which, in the Owner's opinion, are illegible or open to dispute.

.5 Extensions of unit prices and addition of extended unit prices, lump sums and allowances entered in the Schedule of Prices will be checked by the Owner. If arithmetical errors are discovered, the unit prices shall be considered as representing the Bidder's intentions and the unit price extensions and the total amount entered in the Bid Form and Schedule of Prices will be corrected by the Owner. The Bidder shall be bound to such corrected amounts.

.6 If no unit price is stated for an item, but an extended amount is stated, a unit price determined by dividing the extended amount by the estimated quantity shall be considered as representing the Bidder's intentions.

.7 The total amount of the bid shall be the arithmetically correct sum of the arithmetically correct unit price extensions, lump sums and allowances in the Bid Form and Schedule of Prices.

.8 Each unit price stated in the Bid Form and Schedule of Prices shall be a reasonable price for that item of work.

.9 Unless otherwise indicated, quantities specified in the Bid Form and Schedule of Prices are estimated quantities and shall not be considered as actual quantities of work to be performed. Subject to Contract terms, unit prices stated in the Bid Form and Schedule of Prices shall be applied to actual quantities of work performed as measured in accordance with the Contract.

4. SUFFICIENCY OF BID

.1 The submission of a bid shall constitute an incontrovertible representation by the Bidder that:

.1 The Bidder has complied with all bidding requirements,

.2 The Bidder is qualified and experienced to perform the Work in accordance with the Bid Documents,

.3 The bid is based upon performing the Work in accordance with the Bid Documents, without exception, and

.4 The price or prices stated in the bid cover all the Bidder's obligations under the Contract and all matters and things necessary for the performance of the Work in accordance with the Bid Documents.

5. BID DOCUMENTS

.1 The Bid Documents are the documents issued or made available to Bidders by the Owner for the purpose of preparing a bid. The Bid Documents consist of the following:

.1 Instructions to Bidders.

.2 Bid Security.

.3 Pre-Bid Meeting.

.4 Bid Form and Bid Form Supplements.

.5 Bid Modification Form.

.6 Agreement Form.

.7 Definitions.

.8 Payment Conditions.

.9 Contract Performance Security.

.10 Security for Payment of Claims.

.11 Insurance Conditions.

.12 General Conditions of Contract.

.13 Supplementary Conditions.

.14 Specifications, Divisions 1 to 16 inclusive.

.15 Drawings.

.16 Addenda issued during the bid period.

.17 Contract Information Documents.

6. BID FORM

.1 Fill in all blanks in the Bid Form and sign as follows:

.1 Limited Company: Print or type in the space provided the full name of the company and the name(s) and status of authorized signing officer(s). Authorized signing officer(s) shall sign. Sign the Bid Form in the presence of a witness who shall also sign, or in the absence of a witness, affix the corporate seal.

.2 Limited Company Joint Venture: Each joint venture company shall sign as for a limited company.

.3 Partnership: Print or type in the space provided the firm's name and the name(s) of person(s) signing. One or more of the partners shall sign in the presence of a witness who shall also sign.

.4 Sole Proprietorship: Print or type in the space provided the business name and the name of the sole proprietor. The sole proprietor shall sign in the presence of a witness who shall also sign.

.2 Complete the Bid Form in its entirety. Any required information that is omitted or illegible, any alterations to the text, or any conditions added on or submitted with the Bid Form, may cause the bid to be declared invalid and rejected.

7. BID FORM SUPPLEMENTS

.1 Prepare and submit each of the following Bid Form Supplements together with the Bid Form:

.1 Section 00431 - Schedule of Prices: complete the Schedule in its entirety, including all extensions and additions, and attach it to the Bid Form.

.2 Any required information that is omitted or illegible, any alterations to the text, or any conditions added or submitted with a Bid Form Supplement, may cause the bid to be declared invalid and rejected.

.3 Submit all Bid Form Supplements together with the Bid Form.

8. BID MODIFICATION

.1 A bid submitted in accordance with these bidding requirements may be modified, provided the modification:

.1 Is in the form of an email received at gstpierre@rdn.bc.ca before the bid closing time.

.2 For bid closing purposes, the official time of receipt of faxed bid modifications shall be the time of receipt as noted by the Owner's Email System.

.3 When submitting a modification directing a change in a bid amount, do not reveal the original amount nor the revised amount:

.1 On unit price bids, state only the amount to be added to or deducted from each original unit price or lump sum in the Schedule of Prices. Bidders may use the Section 00491 – Unit Price Bid Modification Form included in the Bid Documents.

.4 By submitting a bid modification, the Bidder acknowledges and accepts that its bid modification supersedes all Bidder's previous bid modifications including those containing modifications to its other bid items. Previously submitted bid modifications are all null and void.

.5 Modify the list of Addendum Number(s) on the Bid Modification Form, if different from what was indicated on the originally submitted Bid Form.

.6 The Bidder accepts full responsibility for any lack of confidentiality arising from submitting a bid modification using a facsimile submission process.

.7 Failure of a bid modification to arrive before the closing time, accurately or completely for any reason will render this bid modification null and void. Failure of an emailed bid modification to arrive at the email system at the email address listed herein will render it null and void.

.8 The Owner will assume no responsibility or liability for the content of modifications, or for modifications that are, for any reason, delayed, illegible, unclear as to intent, ambiguous, contrary to these instructions, or otherwise improperly received.

9. BID WITHDRAWAL AND ACCEPTANCE

.1 A bid may be withdrawn at any time before the bid closing time provided the request is in the form of:

.1 An email transmittal received before the bid closing time

.2 Withdrawn bids may be resubmitted in accordance with these bidding requirements providing the resubmitted bid is received at the office indicated in 1.1, before the bid closing time.

.3 A bid may not be withdrawn at or after bid closing time and shall be open to acceptance by the Owner until:

.1 Some other Bidder has entered into a contract with the Owner for the Work, or

.2 60 calendar days after the bid closing time,

whichever occurs first.

.4 The 60 day period referred to above shall commence at midnight of the date of the bid closing and shall terminate at midnight of the 60th day thereafter. If the 60th day falls on a statutory holiday, such day, and any subsequent contiguous holidays, shall be omitted from the computation.

.5 The 60 day acceptance period referred to above may be extended at the Owner's request and subject to the Bidder's written agreement to the extension.

.6 The Contract shall be established upon the Owner issuing to the successful Bidder, a letter accepting the bid.

.7 The lowest or any bid will not necessarily be accepted and the Owner may reject any and all bids.

10. BID OPENING

.1 Bids will not be opened publicly.

.2 The Owner will endeavour to provide bidders with unverified bid results by 10:00am the next business day after the closing.

11. IRREGULARITIES

.1 A bid that is informal, incomplete, qualified, non-compliant with the requirements of the Bid Documents, or otherwise irregular in any way, may be declared invalid and rejected.

.2 The Owner may accept or waive a minor and inconsequential irregularity, or where practicable to do so, the Owner may, as a condition of bid acceptance, request a Bidder to correct a minor and inconsequential irregularity with no change in the bid price.

.3 The determination of what is, or is not, a minor and inconsequential irregularity, the determination of whether to accept, waive or require correction of an irregularity, and the final determination of the validity of a bid, shall be at the Owner’s sole discretion.

.4 Discrepancies between words and figures will be resolved in favour of words.

12. AVAILABILITY OF BID DOCUMENTS

.1 Bid Documents are available to prime contract Bidders at the following address only:

BC Bid – bcbid.gov.bc.ca

.2 The Owner will assume no responsibility or liability for the completeness of any Bid Documents obtained from a source other than the address specified in 12.1.

13. EXAMINATION OF BID DOCUMENTS AND THE SITE

.1 Bidders should, before submitting a bid:

.1 Examine and read the Bid Documents thoroughly,

.2 Visit the site and its surroundings and other locations to become familiar with local and other conditions affecting the Work,

.3 Consider the effect of regulatory requirements applicable to the Work,

.4 Study and correlate Bidder's Site observations with the Bid Documents,

.5 Immediately notify the Owner of all perceived omissions and discovered conflicts, errors and discrepancies in the Bid Documents, and

.6 Understand the Bid Documents and be competent to undertake and complete the Work.

.2 Refer to Section 00300 – Information Documents which identifies available information pertaining to the Project and specifies the status of and the extent, if any, to which the Bidder may rely upon such Information Documents.

.3 Before submitting a bid, each Bidder shall, at the Bidder's expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the conditions at, under, or contiguous with the site, which may affect performance of the Work and which the Bidder deems necessary to determine its bid for performing the Work in accordance with the Bid Documents. Bidders shall obtain the Owner's prior approval for access to the site for the purpose of carrying out any such activities. Bidders shall restore the site to a condition acceptable to the Owner upon completion of such activities.

.4 Lands upon which Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Contractor in performing the Work are identified in the Bid Documents. Additional lands and access thereto required for performance of the Work shall be provided by Contractor.

.5 When Section 00250 - Pre-Bid Meeting, is included in the Bid Documents, a pre-bid meeting is arranged by the Owner to take place during the bid period. The date and time of the meeting will be indicated on the Online Bidding System.

14. BID SECURITY

.1 Provide and submit the bid security specified in Section 00210 - Bid Security.

15. CONSENT OF SURETY

.1 Provide and submit a Consent of Surety Form guaranteeing the required Performance Bond and Labour & Material Payment Bond will be provided should the contractor be awarded the project.

16. CONTRACT PERFORMANCE SECURITY

.1 Provide and include in the bid price for the security specified in Section 00612 - Contract Performance Security.

17. SECURITY FOR PAYMENT OF CLAIMS

.1 Provide and include in the bid price for the security specified in Section 00616 - Security for Payment of Claims.

18. EVIDENCE OF ABILITY TO PROVIDE SECURITY

.1 The Owner may, after the bid submission and before the contract award, require a Bidder to submit evidence of the Bidder's ability to provide the security specified in the Bid Documents.

19. ALLOWANCES

.1 Include in the bid price all allowances specified in Section 01280.

20. AGREEMENT

.1 The successful Bidder will be required to enter into a formal Agreement with the Owner for the performance of the Work.

21. DIVISION OF WORK

.1 Work specified in the Specifications is divided into Divisions and Sections for reference purposes only. Except as may be otherwise specified in the Bid Documents, the division of the Work among the Contractor, Subcontractors, Sub-subcontractors and suppliers is the Bidders' responsibility.

22. INTERPRETATION AND MODIFICATION OF BID DOCUMENTS

.1 Submit questions about the meaning and intent of the Bid Documents to the Owner at the office identified under "Inquiries". Interpretations and modifications considered necessary by the Owner in response to such questions will be issued by the Owner in writing in the form of an Addendum.

.2 Addenda may also be issued by the Owner to modify the Bid Documents as deemed necessary by the Owner.

.3 Submit questions as early as possible in the bid period. The Owner may not respond to questions received too close to the bid closing time to permit issuance of an Addendum.

.4 Submit inquiries as early as possible in the bid period. If an inquiry requires an interpretation or modification of the Bid Documents, but is received too close to the bid closing time to permit issuance of an Addendum, the Owner may be unable to respond to that inquiry.

.5 Any replies to inquiries or interpretations or modifications of the Bid Documents made verbally, by e-mail, or by any manner other than in the form of a written Addendum, shall not be binding.

23. ADDENDA

.1 Addenda, when issued, will become part of the Bid and Contract Documents.

.2 Each Bidder shall ascertain before bid submission, that it has received all Addenda issued by the Owner, and shall indicate in the Bid Form, the Addendum number(s) of all Addenda received.

.3 During the Bid period, all Addenda issued by the Owner will be published on the Online Bidding System.

.4 Bidders who have obtained Bid Documents from any another source may not automatically receive addenda.

24. INQUIRIES

.1 Direct inquiries during bid period to:

Zane Spencer, Eng. L.

MPE Engineering Ltd.
Suite 300, 714 – 5 Avenue S
Lethbridge, AB T1J 0V1

Tel: (403) 329-3442
Email: zspencer@mpe.ca

END OF SECTION

1. TYPE AND AMOUNT OF BID SECURITY

.1 Provide bid security in the form of a bid bond in an amount not less than 10% of the bid price.

.2 Submit bid security with the Bid Form. Bids not accompanied by bid security will be rejected.

.3 The Bid Bond must be a verifiable digital e-bond and a verifiable Consent of Surety to be legal per the Surety Association of Canada. Scanned copies are not acceptable.

2. BID BONDS

.1 Bid bonds shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Bid Bond, CCDC Document No. 220.

.2 Bid bonds shall be issued by a duly incorporated surety company authorized to transact business of suretyship in the Province of British Columbia.

.3 Bid bonds shall be properly executed by both the Bidder and the surety.

3. DEFAULT BY BIDDER

.1 If a Bidder whose bid is accepted by the Owner in writing, without qualification, and within the acceptance period specified in the Bid Documents, refuses or fails within 21 days after the date of issuance of the written acceptance of the bid:

.1 To sign a formal Agreement with the Owner for the performance of the Work, and

.2 To provide contract performance security, or security for payment of claims, or both, if and as required by the Bid Documents,

the Bidder shall be liable to the Owner for the difference between the amount of its bid and the greater amount for which a contract for the Work is entered into with some other Bidder, up to the maximum amount of the bid security provided.

END OF SECTION

1. PRE-BID MEETING AND SITE INSPECTION

.1 A mandatory pre-bid meeting and site inspection will be held at the time and place specified on the cover of this Specification

.2 Purpose is to provide bidders an opportunity to familiarize themselves with the Work and with existing conditions. Owner's representative(s) will be present.

.3 This meeting will be Bidders' only opportunity to inspect the site in the presence of the Owner’s Representative.

.4 Site access is restricted.

.5 All prime contract and major subcontract Bidders are required to attend. Others are invited to attend.

.6 No information provided by the Owner or any of his representatives at the pre-bid meeting and site inspection shall be binding, unless such information is included in an Addendum.

END OF SECTION

1. FROM (Bidder): _____
(Name)

_____
(Address)

TO: **Regional District of Nanaimo**
6300 Hammond Bay Road
Nanaimo, BC V9T 6N2

PROJECT: **Nanoose WSA SCADA Implementation**

2. We, the undersigned, having examined and read the Bid Documents for the above noted contract, and having visited the site and examined all conditions affecting the Work, are satisfied we understand the Bid Documents and declare ourselves competent to undertake and complete the Work and do hereby irrevocably bid and agree to carry out the Work in accordance with the Bid Documents, for the unit prices, lump sums and allowances set out in the Schedule of Prices, the total amount of which is:

$ _____ which amount includes GST.
(Total Amount In Figures Only)

3. This Bid is based on and submitted in accordance with Section 00431 - Schedule of Prices which is attached hereto and which forms an integral part of this bid.

4. This bid includes provisions of the following addenda issued during the bid period:

Addendum Number(s) _____, _____, _____, _____, _____.

5. The total amount of the bid set out in 2. is the sum of all unit price extensions, lump sums and allowances in the Schedule of Prices. It is understood that the unit prices, lump sums and allowances set out in the Schedule of Prices form the basis of the bid price and that the extensions of unit prices and addition of unit price extensions, lump sums and allowances will be checked by the Owner and if arithmetical errors are discovered, the unit prices shall be considered as representing the Bidder's intentions and the unit price extensions and the total amount entered in the Schedule of Prices and the Bid Form will be corrected accordingly by the Owner.

6. The following are being submitted with this bid:

.1 Bid security as specified in Section 00210 of the Specifications.

.2 Section 00431 – Schedule of Prices.

7. If notified in writing by the Owner of the acceptance of this bid within 60 days after the bid closing time, the undersigned will, within 21 days after date of issuance of such notification, execute a formal Agreement with the Owner for the performance of the Work for the above stated compensation and comply with all other requirements of the Bid Documents.

8. It is understood that, with respect to the Bid Form and Schedule of Prices, should any required information be omitted or illegible, should any alteration be made to the text, or should any condition be added on or submitted with the Bid Form or Schedule of Prices, the bid may be declared informal and the bid may be rejected.

9. Executed this _____ day of _____, 2020

NAME AND ADDRESS OF BIDDER: (Print or Type) _____

_____

_____

SIGNATURE OF AUTHORIZED REPRESENTATIVE(S):	NAME AND STATUS OF PERSON(S) SIGNING BESIDE: (Print or Type)
_____	_____
_____	_____

WITNESS'S SIGNATURE OR CORPORATE SEAL:

_____

END OF SECTION

1. FROM (Bidder): _____
(Name)

_____
(Address)

TO: **Regional District of Nanaimo**
6300 Hammond Bay Road
Nanaimo, BC V9T 6N2

PROJECT: **Nanoose WSA SCADA Implementation**

2. This Schedule of Prices forms an integral part of the Bid for the above noted project and shall be read and considered in conjunction with Section 00425 - Unit Price Bid Form.

3. It is understood and agreed that with respect to the submission of this Schedule of Prices, the following shall apply:

   .1 Items of Work are priced in accordance with the Bid Documents, including Section 00630 - Payment Conditions, Section 01275 - Measurement Rules, and Section 01280 - Measurement Schedule.

   .2 Every price requested shall be submitted or the Bid may be declared informal and the Bid may be rejected.

   .3 Should any item be omitted or illegible, should any alteration be made to the text, or should any condition be added on or submitted with the Schedule of Prices, the Bid may be declared informal and the Bid may be rejected.

4. Schedule: See next page.

SCHEDULE A - Nanoose WSA SCADA Implementation

Regional District of Nanaimo
Nanoose WSA SCADA Implementation

The undersigned, having carefully read these Specifications, hereby agrees to supply all labour, superintendence, plant and materials for the completion of the Works described in these Specifications. Payment for Work described by these Specifications will include the following items:

	Description	Qty	Unit	Unit Price	Extension
1.	Div 0 / 1 – General Construction	1	L.S.	$_____	$_____
2.	Division 13 – Special Construction	1	L.S.	$_____	$_____
3.	Division 16 - Electrical	1	L.S.	$_____	$_____

TOTAL SCHEDULE A $ _____

SUMMARY OF SCHEDULES AND PRICES

SCHEDULE A – NAME OF SCHEDULE	$	_____
SUB-TOTAL	$	_____
G.S.T. (5%)	$	_____
TOTAL AMOUNT	$	_____

END OF SECTION

TO: **Regional District of Nanaimo**

Fax Number: 250-390-1542

PROJECT: **Nanoose WSA SCADA Implementation**

1. I _____ , the undersigned, being an authorized representative of the Bidder, modify the Schedule of Prices for our bid as shown in the following schedule.

Item No.	Item Name	Estimated Quantity	Change to Unit Price, or L.S. **+ or -**	Net Change of Extended Amount **+ or -**
	Increase (+) Or Reduce (-) Total Schedule ___:			
	GST (5%):			
	Total Change (+ or -):			

2. Modify here the list of Addendum Number(s), if different from what was indicated on the originally submitted Bid Form: _____, _____, _____, _____, _____.

3. The Bidder acknowledges and accepts the bid modification requirements specified in Section 00200 – Instructions To Bidders, and agrees that:

   .1 This bid modification supersedes all previous bid modifications including those containing modifications to other bid items. Previously submitted bid modifications are all null and void.

.2 The Bidder accepts full responsibility and liability for any lack of confidentiality arising from submitting a bid modification using a facsimile submission process.

.3 Failure of this bid modification to arrive before the closing time, accurately or completely for any reason will render this bid modification null and void. Failure of a faxed bid modification to arrive at the fax machine at the fax number listed herein will render it null and void.

Signature of Authorized Representative	**Status of Person Signing Beside (Print or Type)**
Name Of Bidder (Print Or Type)	**Date**

Send by Fax to 250-390-1542

END OF SECTION

AGREEMENT BETWEEN Regional District of Nanaimo AND (Contractor)

This Agreement made in triplicate on the ..... day of ..... 20.....

between

Regional District of Nanaimo, hereinafter called the "Owner"

and

.....
(Name of Contractor)

.....
(address)

.....

.....
(city, prov, postal code)

hereinafter called the "Contractor"

witnesses: that the parties agree as follows:

ARTICLE 1: THE WORK

The Contractor shall perform the Work required by the Contract Documents for:

Nanoose WSA SCADA Implementation

and do and fulfill everything required by this Agreement.

ARTICLE 2: CONTRACT DOCUMENTS

The Contract Documents referred to in Article 1 of this Agreement shall be as defined in the Contract Documents. Terms used in the Contract Documents which are defined in the Definitions and Interpretation Section shall have the meanings designated therein.

ARTICLE 3: CONTRACT TIME

The Contractor shall attain Substantial Performance of the Work by the following date:

31 day of March 2021.

The Contractor shall attain Total Performance of the Work by the following date:

30 day of April 2021.

ARTICLE 4: CONTRACT PRICE

The Contract Price is ..... dollars

and ..... cents.

($.....) in Canadian funds **(GST included).**

ARTICLE 5: TAXES AND DUTIES

Unless otherwise stated in the Contract Documents, the Contractor shall pay all government sales taxes, customs duties and excise taxes with respect to the Contract.

Any increase or decrease in costs to the Contractor due to changes in such taxes and duties, after the closing date of the Tender submissions, shall increase or decrease the Contract Price accordingly.

Where an exemption from or recovery of government sales taxes, duties or excise taxes is applicable to the Contract, the procedure shall be as established in the Payment conditions and other applicable provisions in the Contract Documents.

ARTICLE 6: PAYMENT

The Owner shall make payment in Canadian funds to the Contractor on account of the Contract Price in accordance with the Payment Conditions and other applicable provisions in the Contract Documents.

The Owner shall hold back an amount equal to 10% from each progress payment as provided for in the Payment Conditions of the Contract Documents.

ARTICLE 7: RIGHTS AND REMEDIES

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the Owner or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

ARTICLE 8: LANGUAGE AND LAW OF THE CONTRACT

The language of the Contract is English and the Contract shall be construed and interpreted accordingly. The law prevailing in the Province of British Columbia, Canada shall govern the interpretation of the Contract.

ARTICLE 9: SUCCESSION

The Contract Documents are to be read into and form part of this Agreement and the whole shall constitute the Contract between the parties and subject to law and the provisions of the Contract Documents shall ensure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and permitted assigns.

ARTICLE 10: NOTICES

Notices to be given under the Contract shall be addressed to the parties as follows:

The Owner at:

Regional District of Nanaimo
6300 Hammond Bay Road
Nanaimo, BC
V9T 6N2

Telephone: (250) 390-4111

The Owner's Representative at:

MPE Engineering Ltd.
Suite 300, 714 – 5 Avenue S
Lethbridge, AB
T1J 0V1

Telephone: (403) 329-3442

The Contractor at:

Contractor's Name
Address
City, Prov
Postal Code

Telephone: ( ) -

In witness whereof the parties hereto have executed this Agreement under their respective seals and by the hands of their proper officers thereunto duly authorized.

SIGNED, SEALED AND DELIVERED in the presence of:

CONTRACTOR

.....
Company Name

.....
Signature of Authorized Signing Officer

.....
Name of Officer Title of Officer

Corporate Seal

OWNER

Regional District of Nanaimo

.....
Name

.....
Signature of Authorized Signing Officer

.....
Name of Officer Title of Officer

Corporate Seal

END OF SECTION

1. DEFINITIONS

In the Contract, the following terms shall have the meanings assigned to them:

.1 "Additional Instruction" means a written instruction, issued by the Owner to the Contractor, clarifying or finalizing requirements of the Contract Documents and not involving a change in the Contract Price or the Contract Time.

.2 "Agreement Form" means the document which, when executed by the Owner and the Contractor, formalizes the Contract.

.3 "Bid" means the Contractor's priced offer to the Owner for the performance of the Work in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance.

.4 “Certificate of Total Performance” means the certificate issued by the Owner’s Representative, when to the best of his knowledge, information and belief, the entire Work has been performed to the requirements of the Contract Documents, except for defects in the Work not discovered by the Owner’s Representative and the making good of faulty workmanship or materials during the maintenance period.

.5 “Certificate of Warranty Performance” means the certificate issued by the Owner’s Representative following a period of twelve (12) months from the date of the Certificate of Substantial Performance, or, if a Certificate of Substantial Performance is not issued, following a period of twelve (12) months from the date of the Certificate of Total Performance, which twelve (12) month period is hereafter referred to as the "maintenance period", certifying that to the best of his knowledge, information and belief the performance of the Work (except for defects in the Work not discovered by the Owner’s Representative) has been completed.

.6 "Change Order" means a written instruction, issued by the Owner to the Contractor on or after the date of execution of the Agreement Form, authorizing or ordering a Change in the Work or a change in the Contract Price or the Contract Time or any combination thereof.

.7 "Change in the Work" means an addition to, deletion from or other modification of the Work consistent with the scope and intent of the Contract.

.8 "Construction Equipment" means equipment, appliances and things required for the performance of the Work, but does not include Permanent Work or Temporary Work.

.9 "Contemplated Change" means a written communication, issued by the Owner to the Contractor on or after the date of execution of the Agreement Form, containing a contemplated Change in the Work and requiring the Contractor to submit a quotation for executing such contemplated change, including the Contractor's proposed changes to either or both the Contract Price or the Contract Time.

.10 "Contract" means the undertaking by the Owner and the Contractor to perform their respective duties, responsibilities and obligations as prescribed in the Contract Documents and represents the entire agreement between the Owner and the Contractor. The Contract Documents form the Contract.

.11 "Contract Deficiency" means a deficiency in the Work, or part thereof, for which the Contractor is responsible under the Contract and includes a deficiency in any design for which the Contractor is responsible.

.12 "Contract Documents" means: - the Letter of Acceptance; - the executed Agreement Form; - Instructions to Bidders, completed Bid Form, Schedule of Prices, and Supplements to Bid Form; - Information Documents specifically incorporated into the Contract Documents; - Definitions and Interpretation, Payment Conditions, Security Conditions, Insurance Conditions, General Conditions, Supplementary Conditions; - the Specifications; - the Drawings; - Addenda; - and such other documents as may be identified as Contract Documents, and shall include amendments thereto made pursuant to the provisions of the Contract.

.13 "Contract Price" means the total amount payable by the Owner to the Contractor under the Contract as stated in the Agreement Form, including authorized adjustments thereto.

.14 "Contract Time" means the period of time specified in the Contract for attainment of substantial Performance of the Work, including authorized adjustments thereto.

.15 "Contractor" means the person, firm or corporation contracting directly with the Owner to perform the Work.

.16 "Cost Plus Work" means a contractual arrangement that prescribes the cost of the work plus an allowance for overhead and profit, as expressly defined in the Contract, as payment for performance of the item of work to which it relates.

.17 "Day" means a calendar day.

.18 "Drawings" means the graphic and pictorial portions of the Contract Documents showing the design, location or dimensions of the Work, generally including plans, elevations, sections, details and diagrams.

.19 “Engineer” means the person or persons named in these Contract Documents as the Owner’s representative. Words importing persons shall include firms, corporations and joint ventures.

.20 "Information Documents" means information of any type and in any form related to the Project and identified in the Contract Documents as such, but which does not form part of the Contract unless specifically incorporated therein.

.21 "Invention" means any new and useful practice, process, machine, device, manufacture or composition of matter, or any new and useful improvement thereof.

.22 "Letter of Acceptance" means the formal acceptance by the Owner of the Contractor's Bid, including any modifications to the Bid agreed to by the Owner and the Contractor and incorporated therein.

.23 "Lump Sum Work" means a contractual arrangement that prescribes a lump sum as payment for performance of the item of work to which it relates.

.24 "Other Contractor" means any person, firm or corporation employed by or having a separate contract with the Owner for work related to the project other than that required by the Contract Documents.

.25 "Owner" means the Owner as named elsewhere in these Contract Documents and includes a person acting for, or in place of, the Owner.

.26 "Owner's Representative" means the employee or Engineer identified in writing by a duly authorized officer to represent the Owner under the Contract.

.27 "Permanent Work" means any structure, Product or thing constructed, manufactured or installed in the performance of the Work, but does not include Temporary Work.

.28 "Products" means material, components, elements, machinery, equipment, fixtures, systems and other items forming the Work or part thereof but does not include Construction Equipment. "Products" is synonymous with "Materials".

.29 "Project" means the total construction of which the Work to be provided under the Contract may be the whole or a part.

.30 "Regulatory Requirements" means laws, ordinances, rules, regulations, orders, codes, and other legally enforceable requirements in effect and applicable to the performance of the Work.

.31 "Schedule of Prices" means the completed Schedule of Prices submitted by the Contractor with his Bid, as accepted by the Letter of Acceptance.

.32 "Site" means the designated Site or location of the Work and any other places as may be specifically designated in the Contract as forming part of the Site.

.33 "Specifications" means that portion of the Contract Documents comprising Divisions 1 to 16 of the specification format including the General Requirements and technical specifications.

.34 "Subcontractor" means a person, firm or corporation having a contract with the Contractor for the performance of a part of the Work at the Site.

.35 "Sub-subcontractor" means a person, firm or corporation having a contract with a Subcontractor for the performance of a part of the Work at the Site.

.36 “Substantial Performance of the Work" means the time when the prerequisites to Substantial Performance of the Work required by the Contract are fulfilled and the Work is ready for use or is being used for the purpose intended and the state of the work is so declared, in writing, by the Owner.

.37 "Supplier" means a person, firm or corporation having a contract with the Contractor, a Subcontractor or a Sub-subcontractor for the supply of goods or services to be incorporated into or utilized in the performance of the Work.

.38 "Temporary Work" means site offices, temporary structures, facilities and controls and other temporary things required for the performance of the Work, but does not include Construction Equipment.

.39 "Total Performance of the Work" means the time when the prerequisites to Total Performance of the Work required by the Contract are fulfilled and the entire Work, except those items arising from the warranty provisions of the Contract, has been performed to the requirements of the Contract Documents and is so declared, in writing, by the Owner.

.40 "Unit Price" means the amount payable by the Owner to the Contractor under the Contract for a single unit of each separately identified item of work for which a unit price is prescribed as the basis of payment, as stated in the Schedule of Prices.

.41 "Unit Price Work" means a contractual arrangement that prescribes the product of a Unit Price multiplied by a number of units of measurement of a class as payment for performance of the item of work to which it relates.

.42 "Warranty Performance of the Work" means the time when the prerequisites to Warranty Performance of the Work required by the Contract are fulfilled and all items arising from the warranty period or periods required by the Contract have been corrected by the Contractor and the state of the Work is so declared, in writing, by the Owner.

.43 "Work" means the total construction and related services required by the Contract Documents.

2. INTERPRETATION

The Contract shall be interpreted as follows:

.1 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

.2 Words importing the singular also include the plural and the masculine includes the feminine and vice-versa where the context requires.

.3 "Herein", "hereby", "hereof", "hereunder" and similar expressions refer to the Contract as a whole and not to a particular part thereof, unless the context indicates otherwise.

.4 Words and abbreviations which have well known technical meanings are used in the Contract in accordance with such recognized meanings.

.5 Words importing persons or parties shall include firms and corporations and any organization having legal capacity.

.6 In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an", but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

.7 The imperative mood is used extensively in the Contract Documents, particularly the Specifications. Such language is always directed to the Contractor, and it is the Contractor’s responsibility to perform the Work specified in the imperative mood, unless specifically stated otherwise.

.8 Unless the context indicates otherwise, where a term is defined in the Contract Documents, other parts of speech or grammatical forms of the same word or expression have corresponding meanings.

.9 Unless the context indicates otherwise, all monetary amounts shall be interpreted as amounts in the lawful currency of Canada.

.10 When provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified, such notice, consent, approval, certificate or determination shall be in writing and the words "notify", "certify" or "determine" shall be construed accordingly. Any such consent, approval, certificate or determination shall not unreasonably be withheld or delayed.

.11 When provision is made for a communication to be "written" or "in writing" this means any handwritten, typewritten or printed communication, including facsimile transmissions.

.12 Except in relation to a change in the Contract Time, any period of time in the Contract within which the Owner or the Contractor is to take action or decide anything may be extended by agreement, notwithstanding that the period of time has expired.

.13 The term "including" or "includes" shall be construed as inclusive and not exclusive, and shall be interpreted to mean including but not necessarily limited to the items referred to.

.14 In the event of ambiguities, discrepancies and conflicts between the several documents forming the Contract Documents the following order of precedence shall apply:

.1 Executed Agreement Form.

.2 Letter of Acceptance.

.3 Addenda.

.4 Supplementary Conditions.

.5 Conditions of Contract, including General, Payment, Security and Insurance Conditions.

.6 Specifications.

.7 Drawings.

.8 Drawings of larger scale shall govern over those of smaller scale of the same date.

.9 Figured dimensions shown on a Drawing shall govern even though they may differ from dimensions scaled on the same Drawing.

Notwithstanding the foregoing, documents of later date shall always govern over the documents amended.

END OF SECTION

1. TYPE AND AMOUNT OF SECURITY

.1 Contractor shall provide security for performance of the Contract in the form of one of the following:

.1 Performance Bond for 50% of the Contract Price.

.2 Security in the form of a bank letter of credit is not acceptable.

.3 Submit security to the Owner within 21 days after date of issuance of Letter of Acceptance.

2. SURETY BOND

.1 Performance bond shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Performance Bond, CCDC Document No. 221. Consign performance bond to the Owner.

END OF SECTION

1. TYPE AND AMOUNT OF SECURITY

.1 Contractor shall provide security for payment to claimants for labour and material used or reasonably required for use in the performance of the Contract. Such security shall be in the form of one of the following:

.1 Labour and Material Payment Bond for 50% of the Contract Price.

.2 Security in the form of a bank letter of credit is not acceptable.

.3 Submit security to Owner within 21 days after date of issuance of Letter of Acceptance.

2. SURETY BOND

.1 Labour and Material bond shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Labour and Material, CCDC Document No. 222. Consign Labour and Material Bond to the Owner.

END OF SECTION

1. RELATED REQUIREMENTS

.1 Hold Harmless Agreement: General Conditions.

2. GENERAL REQUIREMENTS FOR INSURANCE

.1 Without restricting the generality of the hold harmless provisions of the General Conditions of Contract and without limiting the obligations or liabilities under the Contract, Contractor shall, provide, maintain, and pay for the insurance coverages specified in this Section.

.2 Form: Insurance policies shall be placed with Insurers, licensed to conduct business in the Province of British Columbia, who comply with the Insurance Act (British Columbia) and be in forms acceptable to the Owner.

.3 Duration: Unless otherwise specified, required insurance coverages shall be maintained continuously from date of commencement of the Work until date of Total Performance of the Work.

.4 Waiver of Recourse and Subrogation: Contractor waives all rights of recourse and subrogation against Owner for damages to Contractor's property.

.5 Notice of Change to Policy: Each required policy shall be endorsed to provide the Owner with not less than 30 days' advance written notice of cancellation or material change restricting coverage.

.6 Proof of Insurance: Prior to commencement of any activities on site, Contractor shall provide Owner with proof that insurance coverages are in effect and meet specified conditions. In addition, Contractor shall at any time upon request, promptly file certified true copy of any insurance policy and shall otherwise provide proof of any required insurance, in a form acceptable to the Owner.

.7 Subcontractors' Insurance: Contractor shall ensure that Subcontractors provide their own General Liability Insurance, Automobile Liability Insurance, where such risks exist, Aircraft and Watercraft Liability Insurance, and Other Insurance equivalent to that specified herein. With respect to General Liability Insurance, Contractor may alternatively provide such insurance on a wrap-up basis insuring himself, his Subcontractors, and anyone employed directly or indirectly by himself or his Subcontractors to perform a part of the Work.

3. GENERAL LIABILITY INSURANCE

.1 General Liability Insurance shall be in the name of the Contractor. The policy shall include the Owner and the Owner's Representative as Additional Insured with respect to liability arising from the Contractor's operations with regard to the work. The limits shall not be less than five million dollars inclusive per occurrence. The insurance coverage shall include at least the following extensions: Premises, Property and Operations; Occurrence basis, Owners/Contractors' protective, Products and Completed Operations; Blanket Contractual; Employees as Additional Insureds: Broad Form Property Damage; Broad Form Loss of Use; Personal Injury; Incidental Malpractice; Contingent Employers' Liability; Cross Liability/Severability of Interests; Non-Owned Automobile Liability including Endorsement Form 96; Intentional Injury to protect persons or property, X-plate/unlicensed/specially licensed vehicles; Attached Machinery; Voluntary Medical Payments. To achieve the desired limit, umbrella or excess liability insurance may be used. 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.

4. AUTOMOBILE LIABILITY INSURANCE

.1 Automobile Third Party Liability Insurance in respect of licensed vehicles shall have limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property.

5. AIRCRAFT AND WATERCRAFT LIABILITY INSURANCE

.1 Aircraft and Watercraft Liability Insurance with respect to owned or non-owned aircraft or watercraft if used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than two million dollars inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof and limits of not less than one million dollars for Aircraft Passenger Hazard. Such insurance shall be in the form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than thirty (30) days' written notice in advance of cancellation, change or amendment restricting coverage.

6. COURSE OF CONSTRUCTION AND BOILER INSURANCE

.1 All Risk Property Insurance shall be in the joint names of the Contractor and the Owner, insuring not less than the sum of the Contract Price and the full value, as stated in the General Requirements, of products that are specified to be provided by the Owner for incorporation into the Work. The insurance coverage shall be maintained continuously until ten (10) days after the date of the Certificate of Total Performance.

.2 Boiler Insurance insuring the interests of the Contractor, the Owner and the Owner's Representative for not less than the replacement value of boilers and pressure vessels forming part of the Work. The insurance coverage shall be maintained continuously from the commencement of use or operation of the property insured and until ten (10) days after the date of the Certificate of Total Performance.

.3 Should the Owner wish to use or occupy part or all of the Work, he shall give thirty (30) days' written notice to the Contractor of the intended purpose and extent for such use or occupancy. Prior to such use or occupancy the Contractor shall notify the Owner in writing of the additional premium cost, if any, to maintain such insurance which shall be at the Owner's expense. If because of such use or occupancy the Contractor is unable to provide coverage, the Owner, upon written notice from the Contractor and prior to such use or occupancy, shall assume the responsibility to provide, maintain and pay for Property and Boiler Insurance insuring the full value of the Work, as in (a) and (b) above, including coverage for such use or occupancy and the Contractor shall refund to the Owner the unearned premiums applicable to the Contractor's Policies upon termination of coverage.

.4 The Policies shall provide that, in the event of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. The Contractor shall act on behalf of the Owner and himself for the purpose of adjusting the amount of such loss or damage payment with the Insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract except that the Contractor will be entitled to such reasonable extension of time for completion of the Work as the Owner's Representative may decide.

.5 Payment for Loss or Damage:

.1 When the property insurance has been obtained by the Contractor in accordance with the requirements of this Section: The Contractor shall be entitled to receive from the payments made by the Insurer the amount of his interest in the restoration of the work. In addition, the Contractor shall be entitled to receive from the Owner (in addition to the amount due under the Contract) the amount in which the Owner's interest in the restoration of the Work has been appraised, such amount to be paid upon receipt of payment or payments from the Insurer in accordance with the Owner's Representative's certificates for payment.

.2 When the property insurance has been obtained by the Owner pursuant to the terms of the Contract Documents: The Contractor shall be entitled to receive from the payments made by the Insurer the amount of the Contractor's interest in the restoration of the Work. In addition, the Contractor shall be entitled to receive from the Owner (in addition to the amount due under the Contract) the amount in which the owner's interests in the restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds and in accordance with the requirements of Contract Documents.

.6 The Contractor shall be responsible for deductible amounts under the policies.

7. CONTRACTORS' EQUIPMENT INSURANCE

.1 All Risks Contractors' Equipment Insurance covering construction machinery and equipment owned or rented and used by the Contractor and/or Subcontractors for the performance of the Work, including Boiler Insurance on temporary boilers and pressure vessels, shall be in the form acceptable to the Owner.

8. OTHER INSURANCE

.1 Contractor shall provide, maintain and pay for any additional insurance required to be provided by law, or which he considers necessary to cover risks not otherwise covered by insurance specified in the Contract Documents.

END OF SECTION

1. FEDERAL GOODS AND SERVICES TAX

.1 Monies payable by the Owner to the Contractor shall be inclusive of the Federal Goods and Services Tax (GST).

2. BASIS OF PAYMENT

.1 Payment for Lump Sum Work shall be based on the prices in the Contract and, when required by the Contract, the approved schedule of values for such work.

.2 Payment for Unit Price Work shall be based on the Unit Prices in the Contract.

.3 Payment for Cost Plus Work shall be based on the cost of such work, as specified herein, plus a fee in the amount of 10% of the cost of such work for the Contractor's overhead and profit except that no fee shall be applied to the cost of Construction Equipment when such cost is based on rates which already include the Contractor's overhead and profit.

.4 The cost of Cost Plus Work shall be computed as the sum of the following cost elements as applicable to such work:

.1 Cost of labour (other than labour costs included in other cost elements) comprised of payroll costs for employees in the direct employ of the Contractor. Such employees shall include the superintendent and foremen at the Site. Payroll costs shall include salary, fringe benefits and statutory charges paid by Contractor. Fringe benefits shall include health care, vacations with pay, sick time allowance, and pension plan, life and disability insurance, dental and medication plan contributions. Statutory charges shall include contributions for Canada Pension Plan, Workers' Compensation, statutory holidays and Unemployment Insurance. Labour rates shall be consistent with rates actually paid for equivalent job classifications in the normal performance of Lump Sum Work or Unit Price Work or, if there are no such equivalencies, under a schedule of job classifications and labour rates agreed upon by the Owner and the Contractor, if possible before labour costs are incurred.

.2 Cost of Products supplied and incorporated into Permanent Work, including cost of transportation and storage thereof and Supplier's site services required in connection therewith. Cash discounts shall accrue to the Contractor. Trade discounts, rebates and refunds and returns from sale of surplus Products shall accrue to the Owner.

.3 Cost of Construction Equipment:

Cost of Construction Equipment shall be paid at the rates specified in the current edition of the Equipment Rental Rates Guide published by the BC Roadbuilders and Heavy Construction Association, hereinafter called the "Rates Guide", subject to the following:

.1 Rates specified in the Rates Guide shall be deemed to include all overhead and profit, regardless of whether Construction Equipment is provided by the Contractor, Subcontractors or Sub-subcontractors.

.2 Rates specified in the Rates Guide shall be deemed to include cost of owning, operating, loading, unloading, assembling, erecting, and dismantling.

.3 When applicable rates are not included in the Rates Guide, costs shall be paid at the rates agreed upon by the Owner and the Contractor, if possible before such costs are incurred.

.4 Cost of moving Construction Equipment to and from the Site shall not be payable, unless such cost is solely attributable to the Work and is approved as such by the Owner.

.5 Except for Construction Equipment traveling under its own power, travel time for Construction Equipment shall not be payable. Unless otherwise approved by the Owner, Construction Equipment shall be moved by the most economical method.

.5 Cost of Temporary Work, including cost of transportation and maintenance thereof, used and consumed in the performance of the Work and the cost less fair market value of such work used but not consumed which shall remain the property of the Contractor.

.6 Cost of special services, including the cost of architects, engineers, specifiers, surveyors, testing laboratories and inspection agencies.

.7 Supplemental costs, including:

.1 Travel and subsistence costs of Contractor's employees;

.2 Statutory charges, including fees, cost of permits and licenses and custom duties;

.3 Cost of rights-of-way and other land related costs;

.4 Royalty payments and patent license fees;

.5 Deposits lost for causes other than the Contractor's fault or negligence.

.8 Subcontract and Sub-subcontract costs, including payments made by the Contractor to Subcontractors and by Subcontractors to Sub-subcontractors in accordance with the requirements of such contracts. Subcontractors' and Sub-subcontractors' costs and fee for overhead and profit for Cost Plus Work to be performed under such contracts shall be determined in the same manner as the Contractor's cost and fee.

.9 With respect to Cost Plus Work:

.1 Costs payable by Owner shall be directly related to or shall have been necessarily and properly incurred in the performance of such work.

.2 Overhead shall include the Contractor's costs related to the operation and maintenance of his head office and branch offices, administration at head office and branch offices, general management, legal, audit and accounting services, buying organization, corporate tax, financing and other bank charges, company directors, salaries and other compensation of personnel stationed off-site, design of Construction Equipment and Temporary Work, supervision, planning and scheduling of work, expendable and unexpendable small tools, including maintenance thereof, clean up and recruitment and training of site staff.

.3 Contractor shall obtain the Owner's prior approval to subcontract or enter into other agreements for Cost Plus Work.

.4 Costs claimed for delay or extension of the contract will be considered only if the Contractor has clearly demonstrated the work delayed or extended the critical path of the project.

.5 The Owner may refuse to pay all or part of the cost of any Work item under any cost element, where the item in question was, in the Owner's opinion, unsuitable for the Work performed.

3. MEASUREMENT FOR PAYMENT

.1 Unless otherwise specified in the Contract, the Owner shall measure the Work for the purpose of determining payment to the Contractor in accordance with the measurement provisions of the Contract.

4. PROGRESS PAYMENTS

.1 Prior to Substantial Performance of the Work, the Owner shall make monthly payments to the Contractor.

.2 Within 7 days after the end of each monthly payment period, the Contractor shall submit to the Owner:

.1 Completed Statutory Declaration Form, at and after the second monthly payment period,

.2 Workers' Compensation Board verification that the Contractor's account is in good standing,

.3 Any data requested by the Owner to assist the Owner to determine the amount due and payable to the Contractor, and

.4 For Products stored by the Contractor on the Site for incorporation in Permanent Work but not incorporated in such Work, proof of purchase price and delivery to the Site, along with a statement of the quantity of such Products and the Schedule of Prices item to which the Products relate.

.3 The Owner shall, within 45 days after the end of each monthly payment period and subject to having received within the time specified any required information referred to in clause 4.2, pay to the Contractor the amount which the Owner determines to be due and payable to the Contractor, up to the end of the monthly payment period in respect of:

.1 The value of Work executed;

.2 The value of Work executed pursuant to authorized Changes in the Work;

.3 The value of Products stored by the Contractor on the Site for incorporation in Permanent Work but not incorporated in such Work;

.4 Adjustments due to changes in Regulatory Requirements or price fluctuation provisions of the Contract, if applicable;

.5 Any other amount determined by the Owner; and

.6 Subject to:

.1 any deductions under clause 10;

.2 any withholdings under clause 11; and

.3 retention of the holdback amount calculated by applying the holdback percentage referred to in clause 5 to the amount payable to the Contractor under clause 4.3 after any deductions and withholdings.

.4 For Unit Price Work, Owner may, at his discretion, make partial payment based on partial completion of the scope of a single unit of an item of Work.

.5 If, after receipt of a progress payment from the Owner, the Contractor disagrees with the amount of such payment, such amount shall nevertheless be considered to be correct unless the Contractor, within 7 days after such receipt, notifies the Owner of the respects in which such payment is claimed by him to be incorrect. On receipt of such notice, the Owner shall review the amount of the payment and either confirm or vary it. If the Owner varies the payment, such variance shall be added to the next progress payment.

.6 Notwithstanding the terms of this clause or any other clause of the Contract, no amount shall be paid by the Owner until the contract security and proof of insurance, if required under the Contract, have been provided by the Contractor.

5. HOLDBACK

.1 The Owner shall hold back the percentage specified in the Agreement Form from each progress payment referred to in clause 4.

.2 Fifty-five (55) days after the date of a Certificate of Substantial Performance, if issued, the Owner will pay to the Contractor, the unpaid balance of holdback moneys then due, provided:

.1 Third party claims, received by the Owner pursuant to the Builders' Lien Act or applicable requirements of the Contract have been resolved, or addressed and a course of action agreed to by the Owner and the Contractor,

.2 The Contractor has submitted to the Owner, within 7 days after the date of Substantial Performance, a letter of clearance from the Workers' Compensation Board and a completed Statutory Declaration Form,

.3 The Contractor has submitted to the Owner, a letter from the Contractor's Surety (if any) approving the release of the holdback,

.4 The Contractor has submitted to the Owner, all Record Documents, showing changes as constructed, Operating and Maintenance Manuals, guarantees, warranties, certificates, reports, spare parts and spare material required by the Contract Documents,

.5 The Contractor has submitted to the Owner, a statement verifying that "all payment quantities on the completed portion of the Contract have been accepted; and all claims, all demands for Extra Work, or otherwise, under or in connection with the completed portion of the Contract have been presented to the Owner's Representative".

.3 Fifty-five (55) days after the date of Total Performance, the Owner will pay to the Contractor, the unpaid balance of holdback moneys then due, provided:

.1 Third party claims, received by the Owner pursuant to the Builders' Lien Act or applicable requirements of the Contract have been resolved, or addressed and a course of action agreed to by the Owner and the Contractor,

.2 The Contractor has submitted to the Owner, within 7 days after the date of Substantial Performance, a letter of clearance from the Workers' Compensation Board and a completed Statutory Declaration Form,

.3 The Contractor has submitted to the Owner, a letter from the Contractor's Surety (if any) approving the release of the holdback,

.4 The Contractor has submitted to the Owner, all Record Documents, showing changes as constructed, Operating and Maintenance Manuals, guarantees, warranties, certificates, reports, spare parts and spare material required by the Contract Documents,

.5 The Contractor has submitted to the Owner, a statement verifying that "all payment quantities on the completed portion of the Contract have been accepted; and all claims, all demands for Extra Work, or otherwise, under or in connection with the completed portion of the Contract have been presented to the Owner's Representative".

6. FINAL PAYMENT

.1 Upon the accepted date of Total Performance, the Owner will pay to the Contractor the unpaid balance of any monies then due under the Contract, PROVIDED THAT the Owner's Representative may withhold, or on account of subsequently discovered evidence, nullify the whole or any part of any certificate to such an extent as may be necessary to protect the Owner from loss on account of:

.1 The Contractor's unsatisfactory prosecution of the Work.

.2 Defective or damaged Work requiring correction or replacement.

.3 Claims or liens filed or reasonable evidence indicating the probable filing of claims or liens.

.4 Failure of the Contractor to make payments promptly to subcontractors or for materials or labour.

.5 A reasonable doubt that the Contract can be completed for balance unpaid.

.6 Damage to an Other Contractor's Work which has not been settled which may result in the Other Contractor whose Work has been damaged bringing action against the Owner. In case of action, the Contractor will bear the expense of same.

.7 When the above conditions are resolved to the satisfaction of the Owner, payment shall be made for the amounts withheld because of them.

.2 If the final statement is considered by the Contractor to be incorrect, the Contractor shall submit to the Owner a notice of claim, including substantiation, notwithstanding the time provisions of clause 10 of the General Conditions.

.3 If the Owner does not receive a notice of claim pursuant to clause 6.2 within the time specified, the final statement shall be considered correct.

.4 The final payment shall represent full and final settlement of all monies due to the Contractor pursuant to the Contract except with respect to unresolved claims, if any.

7. OWNER'S LIABILITY

.1 After the final payment issued has been made, the Owner shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract, except as may be provided elsewhere in the Contract, unless the Contractor shall have made a claim in respect therefore prior to or within the time specified in the Builders' Lien Act.

8. DELAY IN MAKING PAYMENT

.1 In respect of progress payments, payment after Substantial Performance of the Work, payment of holdback, and final payment, the Owner shall pay the Contractor an amount that the Owner considers to be due to the Contractor, pursuant to the Contract, within the time specified.

9. RIGHT OF SET-OFF

.1 Without limiting any right of set-off, deduction or recovery given or implied by law or elsewhere in the Contract, the Owner may set off any amount payable to the Owner by the Contractor, or recoverable from the Contractor by the Owner, under the Contract or under any other current contract against any amount payable to the Contractor under this Contract.

.2 For the purposes of these Payment Conditions, "other current contract" means a contract between the Owner and the Contractor under which the Contractor has an undischarged obligation to perform or supply work, labour, or material, or in respect of which the Owner has, since the date of execution of the contract agreement, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.

10. DEDUCTIONS FROM PAYMENTS

.1 Owner may deduct from any amount claimed by or payable to Contractor:

.1 An amount at least equal to the value, as determined by Owner, of Work not in accordance with Contract Documents,

.2 The amount of any unresolved third party claim submitted pursuant to the Builders' Lien Act or applicable requirements of the Contract,

.3 The amount of any unpaid and overdue statutory account related to the Contract and of which the Owner has received notice and which is enforceable against the Owner,

.4 The amount of any overpayment made by the Owner to the Contractor, and

.5 Any other amount recoverable by the Owner from the Contractor under the Contract.

11. TITLE TO AND ACCEPTANCE OF WORK

.1 Contractor warrants that title to work and Products covered by any payment made by the Owner to the Contractor will pass to the Owner, at the time of payment, free and clear of all claims, interests and encumbrances.

.2 Contractor further warrants that Products stored at the Site and for which payment has been received, shall not be removed from the Site and shall be kept secure and protected.

.3 Payments made by Owner shall not be construed as an acceptance that the Work, Products, or any part thereof is complete, is satisfactory or is in accordance with the Contract Documents.

END OF SECTION

9794-002-00

Statutory Declaration
of Payment Distribution

Identification of Contract

Contract Name (location and description of the Work as it appears in the Contract Documents)

Date of This Application for Payment
Month Day Year
Date of Last (Immediate Preceding) Application for Payment
Month Day Year

Identification of Declarant (person making the declaration)

Full Name of Declarant	Position or Title (of office held with Contractor)	
Business Name (Name of Contractor)		
Business Address		
City or Town	Province	Postal Code

Declaration

I, the undersigned, solemnly declare that as of the date of this application for payment:

.1 all the Contractor's lawful obligations to subcontractors and suppliers, in respect of work contracted for and performed before the date of the last (immediate preceding) application for payment, are fully discharged, except for (i) hold back monies properly retained, and (ii) payments deferred by agreement;

.2 all the Contractor's lawful obligations to workers, in respect to work contracted for, are fully discharged;

.3 all assessments and payments required to be made by the Contractor under law have been made in full; and that

.4 I am an authorized signing officer of the Contractor and have personal knowledge of the contract identified and the facts stated in this statutory declaration.

I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

Making a false or fraudulent declaration is a contravention of the Criminal Code of Canada, and could carry, upon conviction, penalties including fines, imprisonment, or both.

_____
Signature of declarant

Attestation (to be completed by a person empowered to receive declarations, e.g. Commissioner of Oaths, Notary Public, etc.)

DECLARED before me at _____ this _____ day of _____ 20 ____
City/Town and Province

_____ _____ _____
Signature of person before whom declaration is made | Authority to receive solemn declarations | Expiry date

_____
Name (please print)

Any changes or corrections on this Statutory Declaration must be initialed by the person before whom the declaration is made.

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1. OWNER AND OWNER'S REPRESENTATIVE

1.1 OWNER'S DUTIES AND AUTHORITY

.1 The Owner shall carry out the duties and exercise the authority specified in the Contract.

1.2 OWNER'S REPRESENTATIVE

.1 The Owner shall appoint a representative, who shall, unless the Contractor is expressly advised otherwise by the Owner, have full authority to act on behalf of and bind the Owner under the Contract.

1.3 APPOINTMENT OF ASSISTANTS

.1 The Owner's Representative may appoint any number of persons to assist him in carrying out his duties. He shall notify the Contractor of the names, duties and scope of authority of such persons.

.2 The failure of any assistants appointed pursuant to clause 1.3.1 to disapprove any work shall not prejudice the authority of the Owner to disapprove such work and to give instructions for the rectification thereof.

1.4 INSTRUCTIONS IN WRITING

.1 The Contractor shall take instructions only from the Owner or any assistants appointed pursuant to clause 1.3. Instructions given by the Owner shall be in writing, provided that if the Owner considers it necessary to give any instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Owner, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this clause. Provided that if the Contractor, within 7 days, confirms in writing to the Owner any oral instruction of the Owner and such confirmation is not contradicted in writing within 7 days by the Owner, it shall be deemed to be an instruction of the Owner.

1.5 OWNER INTERPRETER OF CONTRACT

.1 The Owner in the first instance shall be the interpreter of the Contract and the judge of the Contractor's performance.

1.6 OWNER'S DETERMINATIONS

.1 When the Owner is required to exercise his discretion by giving his decision, opinion or consent, or expressing his satisfaction or approval, or determining value, or otherwise taking action which may affect the rights and obligations of the Contractor he shall exercise such discretion within the terms of the Contract after due consultation with the Contractor and shall promptly notify the Contractor of such decision, opinion, consent, approval or determination.

1.7 OWNER'S REVIEW

.1 Any review, comment, consent, acceptance or approval, or lack thereof, by the Owner, shall not relieve the Contractor of any of its responsibilities or liabilities under the Contract.

2. ASSIGNMENT, SUBCONTRACTING AND NOMINATION

2.1 ASSIGNMENT

.1 The Contractor shall not assign the Contract, either in whole or in part, without the previous written consent of the Owner, which consent, notwithstanding other provisions of the Contract, shall be at the Owner's sole discretion.

.2 The Owner shall not be bound by any assignment by the Contractor of any monies payable or to become payable to the Contractor under the Contract, without the written consent of the Owner, which consent:

.1 Will not be given for a general assignment of book debts, but

.2 May, at the Owner's sole discretion, be given for a specific assignment of all or part of monies payable to the Contractor under the Contract, subject however, in all cases, to the provisions of the Financial Administration Act (British Columbia).

2.2 SUBCONTRACTING

.1 The Contractor:

.1 Shall not sublet the Contract as a whole,

.2 Shall not subcontract any part of the Work without the Owner's prior consent, which shall not be unreasonably withheld,

.3 Shall provide such details of any Subcontractor he wishes to engage as the Owner may require,

.4 Shall contract with those Subcontractors proposed by him and accepted by the Owner and such Subcontractors shall not be changed without the Owner's prior consent.

.2 The Owner may, for reasonable cause, object to the use of a proposed Subcontractor and require the Contractor to contract with another Subcontractor.

.3 If the Owner requires a change from a proposed Subcontractor, the Contract Price shall be adjusted by any difference in cost and markup occasioned by such required change, except where such change is required due to the Contractor's default or negligence, in which case there shall be no change in the Contract Price.

.4 The Owner may, upon reasonable request and at his discretion, provide to a Subcontractor information as to the percentage or quantity of the Subcontractor's work for which payment has been approved.

.5 Nothing contained in the Contract shall create a contractual relationship between a Subcontractor and the Owner and subcontracting part of the Work shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any Subcontractor, his agents, servants or workers as fully as if they were his own.

.6 The Contractor shall enter into contracts or written agreements with his Subcontractors to require them to perform their work in accordance with the Contract, and the Contractor shall incorporate the terms and conditions of the Contract Documents, to the extent that they apply, into all subcontracts.

2.3 NOMINATED SUBCONTRACTORS AND SUPPLIERS

.1 A nominated Subcontractor or nominated Supplier means a person, firm or corporation with whom the Contract requires the Contractor to enter into a contract for the performance of a subcontract or the supply of things related to the Work.

.2 Nothing contained in the Contract shall create a contractual relationship between the Owner and a nominated Subcontractor or nominated Supplier and such nomination shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any nominated Subcontractor or nominated Supplier, his agents, servants or workers as fully as if they were his own.

3. DOCUMENTS

3.1 PROPERTY AND USE OF CONTRACT DOCUMENTS

.1 The Contract Documents are the sole property of the Owner and unless it is necessary for the purposes of the Contract, the Contract Documents shall not, without the consent of the Owner, be used by or communicated to a third party by the Contractor.

3.2 REPORTING OF CONFLICTS, ERRORS AND DISCREPANCIES

.1 If the Contractor finds a conflict, error or discrepancy in the Contract Documents, the Contractor shall so report to the Owner in writing at once and, before proceeding or continuing with the Work affected thereby, shall obtain a written interpretation or clarification from the Owner; however, the Contractor shall not be liable to the Owner for failure to report any conflict, error or discrepancy in the Contract Documents unless the Contractor had actual knowledge thereof or should reasonably have known thereof.

.2 The Contractor shall obtain from the Owner any dimensions required but not indicated in figures in the Contract Documents nor calculable from figures in the Contract Documents. Scaling of Drawings, for any purpose, shall be at the Contractor's risk.

3.3 DISRUPTION OF PROGRESS

.1 The Contractor shall notify the Owner when planning or execution of the Work is likely to be delayed or disrupted unless any further document or instruction required of the Owner under the Contract is issued by the Owner within a reasonable time. The notice shall include details of the document or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

.2 If, by reason of any failure or inability of the Owner to issue, within a reasonable time, any document or instruction for which notice has been given by the Contractor in accordance with clause 3.3.1, the Contractor suffers delay or incurs costs then the Owner shall determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount of such costs, which shall be added to the Contract Price.

.3 If the failure or inability of the Owner to issue any documents or instruction is caused in whole or in part by the failure of the Contractor to submit documents, which he is required to submit under the Contract, the Owner shall take such failure by the Contractor into account when making his determination pursuant to clause 3.3.2.

3.4 ADDITIONAL INSTRUCTIONS

.1 The Owner shall have authority to issue to the Contractor, from time to time, such Additional Instructions as may be necessary for the proper performance of the Work. The Contractor shall carry out and be bound by such Additional Instructions.

3.5 FORMS

.1 Forms to be used pursuant to the Contract or as otherwise may be required for the administration of the Contract shall be as prescribed or approved by the Owner.

4. GENERAL OBLIGATIONS

4.1 CONTRACTOR'S RESPONSIBILITIES

.1 The Contractor shall, with due care and diligence, design, to the extent provided for by the Contract, execute and complete the Work and remedy any defects therein in accordance with the provisions of the Contract. This shall include the provision of superintendence, labour, Products, Construction Equipment, Temporary Work and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects. The Contractor shall comply with and adhere strictly to the Owner's instructions on any matter, whether mentioned in the Contract or not, concerning the Work.

4.2 CONTRACT SECURITY

.1 The Contractor shall, if required by the Bid Documents, provide either or both contract performance security or security for payment of claims for labour and material.

.2 Surety bonds shall be issued by a duly incorporated surety company authorized to transact business of suretyship in the Province of British Columbia.

.3 The Owner may, for reasonable cause, object to use of the surety company proposed by the Contractor, and may require the Contractor to provide a surety bond issued by another surety company acceptable to the Owner, with no change in Contract Price.

4.3 SITE OPERATIONS AND METHODS OF CONSTRUCTION

.1 The Contractor shall be fully responsible for the adequacy, stability and safety of all Site operations and methods of construction.

.2 The Contractor shall submit at such times and in such detail as the Owner may require such information pertaining to the methods of construction (including Temporary Work and the use of Construction Equipment) which the Contractor proposes to use and such calculations of stresses, strains and deflections that will arise, in the Permanent Work or any part thereof, from the use of such methods during execution of the Work.

.3 The Owner shall, on request from the Contractor, provide to the Contractor such design criteria relevant to the Permanent Work or any Temporary Work designed by the Owner as may be necessary to enable the Contractor to comply with clause 4.3.2.

.4 For the purposes of this clause, "method of construction" means a method, means, technique, sequence or procedure of construction.

4.4 DIFFERING PHYSICAL CONDITIONS OR OBSTRUCTIONS

.1 If, during the execution of the Work, the Contractor encounters physical obstructions or physical conditions, including sub-surface obstructions or conditions, other than weather conditions or conditions due to weather conditions, on the Site, which, in his opinion, differ substantially from those indicated in the Contract and which were not reasonably foreseeable, the Contractor shall as soon as possible give notice thereof to the Owner. On receipt of such notice, the Owner shall, if in his opinion such obstructions or conditions differ substantially from those indicated in the Contract Documents and could not have been reasonably foreseen, determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount of any costs, valued in accordance with clause 8.3, which may have been incurred by the Contractor by reason of such obstructions or conditions having been encountered, which shall be added to the Contract Price.

.2 A determination by the Owner pursuant to clause 4.4.1 shall take account of:

.1 The time of the Contractor's notice to the Owner of a differing physical condition or obstruction,

.2 Any instruction which the Owner may have issued to the Contractor in connection therewith, and

.3 Any proper and reasonable measures acceptable to the Owner, which the Contractor may have taken in the absence of specific instructions from the Owner.

4.5 CLIMATIC AND WEATHER CONDITIONS

.1 The relevant climatological records and related information published by the Canadian Climate Centre of Environment Canada, for one or more locations in the vicinity of the Site, shall be used as a basis for any evaluations and determinations concerning climate and weather.

4.6 CONTRACTOR'S SUPERINTENDENCE

.1 The Contractor shall provide all necessary superintendence during the execution of the Work and as long thereafter as the Owner may consider necessary for the proper fulfilling of the Contractor's obligations. The Contractor, or a competent and authorized representative approved of by the Owner, which approval may at any time be withdrawn, shall give his whole time to the superintendence of the Work. Such authorized representative shall receive, on behalf of the Contractor, instructions from the Owner.

.2 If approval of the Contractor's representative is withdrawn by the Owner, the Contractor shall, as soon as is practicable, after receiving notice of such withdrawal, remove the representative from the Work and shall not employ him again on the Work in any capacity and shall replace him by another representative approved by the Owner.

4.7 CONTRACTOR'S EMPLOYEES

.1 The Contractor shall provide on the Site in connection with the execution and completion of the Work and the remedying of any defects therein:

.1 Technical assistants who are skilled and experienced in their respective trades and such foremen and others as are competent to give proper superintendence of the Work, and

.2 Labour as is necessary for the proper and timely fulfilling of the Contractor's obligations.

4.8 OWNER MAY OBJECT

.1 The Owner may object to and require the Contractor to remove forthwith from the Site any person who, in the opinion of the Owner, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose presence is otherwise considered by the Owner to be undesirable, and such person shall not be allowed on the Site without the consent of the Owner.

4.9 SAFETY, SECURITY AND PROTECTION OF THE ENVIRONMENT

.1 The Contractor shall, throughout the execution of the Work and the remedying of any defects therein:

.1 Have full regard for the health and safety of all persons upon the Site and keep the Site and the Work, to the extent that they are under his control, in an orderly state appropriate to the avoidance of danger to such persons, and

.2 Provide and maintain at his own cost all temporary facilities and controls when and where necessary or required by the Owner or by any duly constituted authority, for the protection of the Work or for the safety and convenience of the public or others, and

.3 Take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or any other causes arising as a consequence of his methods of operation.

.2 The Contractor shall appoint a person at the Site who shall manage an accident prevention program. This person shall be Contractor's superintendent unless another person is appointed and approved by the Owner.

4.10 OWNER'S RESPONSIBILITIES FOR SAFETY

.1 If under clause 4.18 the Owner carries out work on the Site with his own workers he shall, in respect of such work and subject to clause 4.9:

.1 Have full regard to the safety of all persons upon the Site, and

.2 Keep the Site in an orderly state appropriate to the avoidance of danger to such persons.

.2 If under clause 4.18 the Owner contracts with Other Contractors on the Site he shall require them to have the same regard for safety and avoidance of danger.

4.11 CARE OF WORK

.1 The Contractor shall take full responsibility for the care of the Work from the date of commencement of Work at the Site until the date of issue of the Certificate of Substantial Performance of the Work, when the responsibility for such care shall pass to the Owner, provided that:

.1 Except where otherwise specified in the Contract, if the Owner accepts a Certificate of Substantial Performance for part of the Permanent Work the Contractor shall cease to be liable for the care of that part from the date of issue of such certificate, then the responsibility for the care of that part shall pass to the Owner, and

.2 The Contractor shall take full responsibility for the care of any outstanding Work which he undertakes to finish during the warranty period until such outstanding Work has been completed.

4.12 RESPONSIBILITY TO RECTIFY LOSS OR DAMAGE

.1 If there is any loss or damage to the Work, or any part thereof, or to Products for incorporation therein, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, the Contractor shall, at his own cost, rectify such loss or damage so that the Work conforms with the provisions of the Contract to the satisfaction of the Owner. The Contractor shall also be liable for any loss or damage to the Work occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under the warranty provisions of the Contract.

4.13 HOLD HARMLESS AGREEMENT

.1 The Contractor shall hold harmless the Owner from any and all third party claims, demands, or actions for which the Contractor is legally responsible, including those arising out of negligence, willful harm, or crimes by the Contractor or the Contractor's employees or agents. This hold harmless shall survive the Contract.

4.14 REGULATORY REQUIREMENTS

.1 The Contractor shall conform in all respects, including by the giving of all notices and the paying of all fees, with the provisions of:

.1 Any Regulatory Requirements, and

.2 The rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Work, and the Contractor shall keep the Owner indemnified against all penalties and liability of every kind for breach of any such provisions.

.2 The Owner shall be responsible for obtaining any planning, zoning or other similar permission required for the Project to proceed.

.3 Without limiting the Contractor's obligations under clause 4.14.1, the Contractor shall:

.1 Comply with all requirements of and pay all fees in connection with the Workers' Compensation Act (British Columbia),

.2 Comply with the Occupational Health and Safety Act (British Columbia) and all safety requirements as contained in the regulations thereto,

.3 Ensure that wages, hours of work and other conditions of employment of all persons employed by the Contractor in the performance of any work required by the Contract are in compliance with the requirements of the Employment Standards Code (British Columbia), the Labour Relations Code (British Columbia) and any other applicable law, rule, regulation or order, and

.4 Pay all fees and charges levied by a municipal authority in respect of applicable permits and licences.

4.15 PATENT RIGHTS

.1 The Contractor shall indemnify the Owner from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Product, Construction Equipment, Temporary Work or other thing used for or in connection with or for incorporation in the Work and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, except where such infringement results from compliance with the design or specification provided by the Owner.

4.16 ROYALTIES

.1 Except as otherwise provided in the Contract, the Contractor shall be liable for all tonnage and other royalties, rent and other payments or compensation, if any, for obtaining stone, sand, gravel, clay or other materials required for the Work.

.2 The Contractor shall be liable for all payments or other compensation, if any, levied in relation to the dumping of all or part of any waste materials.

4.17 OTHER CONTRACTORS

.1 The Contractor shall, in accordance with the requirements of the Owner, afford all reasonable opportunities for carrying out their work to:

.1 Any Other Contractors of the Owner and their workers,

.2 The workers of the Owner, and

.3 The workers of any duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Owner may enter into in connection with or ancillary to the Work.

.2 Pursuant to clause 4.18.1 and except as may be provided in the Contract, the Contractor shall, on the request of the Owner:

.1 Make available to any person referred to in clause 4.18.1, any roads or ways for the maintenance of which the Contractor is responsible, or

.2 Permit the use, by any such persons, of Temporary Work or Construction Equipment on the Site, or

.3 Provide any other service for any such person, the Owner shall determine an addition to the Contract Price in accordance with clause 8.3.

4.18 PERMANENT WORK DESIGNED BY CONTRACTOR

.1 Where the Contract provides that part of the Permanent Work shall be designed by the Contractor, he shall submit to the Owner, for review:

.1 Such drawings, specifications, calculations and other information as is necessary for the Owner's review, and

.2 Operation and maintenance manuals, as applicable, together with drawings of the Permanent Work as completed, in sufficient detail to enable the Owner to operate, maintain, dismantle, reassemble and adjust the Permanent Work incorporating that design, and such design and any alterations thereto shall be performed by a qualified design professional licensed to practice in British Columbia.

.2 The Contractor shall not commence any work to which the information referred to in clause 4.19.1 relates unless such information has been reviewed by the Owner, and the Contractor shall not thereafter alter such design without the Owner's review.

4.19 RECORDS AND AUDIT

.1 With respect to Cost Plus Work, the Contractor shall:

.1 Keep accurate records of estimated and actual costs, payments made and time spent;

.2 Keep record copies of bids, quotations, contracts, correspondence, invoices, receipts and vouchers related thereto;

.3 Make such records available for inspection and audit by the Owner for a period of at least 2 years after the date of Total Performance of the Work;

.4 Provide the Owner with copies and extracts therefrom when requested by the Owner; and

.5 Afford facilities for audit and inspection by the Owner at mutually agreeable times and places.

.2 The Contractor shall cause Subcontractors and other persons directly or indirectly controlled by or affiliated with the Contractor and persons directly or indirectly having control of the Contractor to comply with clause 4.20.1 as if they were the Contractor.

4.20 RECORD OF LABOUR AND CONSTRUCTION EQUIPMENT

.1 The Contractor shall, if required by the Owner, deliver to the Owner a record in detail, in such form and at such intervals as the Owner may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Construction Equipment as the Owner may require.

4.21 CUSTOMS

.1 With respect to the importation and re-export of Construction Equipment, Temporary Work, Products and other things required for the Work, the Contractor shall:

.1 Be liable for all applicable customs, import duties, taxes and brokerage fees, and

.2 Be responsible for obtaining clearance through Customs. If requested by the Contractor, the Owner may assist in obtaining such clearance.

4.22 URGENT REMEDIAL WORK

.1 If, due to any accident, or failure, or other event occurring to, in, or in connection with the Work, or any part thereof, either during the execution of the Work, or during the warranty period, any remedial or other work is, in the opinion of the Owner, urgently necessary for the safety of the Work, persons or property and the Contractor is unable or unwilling at once to do such work, the Owner may employ other persons or contract with other firms or corporations to carry out such work as the Owner may consider necessary.

.2 If the work or repair done by the Owner pursuant to clause 4.23.1 is work which, in the opinion of the Owner, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall be determined by the Owner and shall be recoverable from the Contractor by the Owner.

5. QUALITY OF PRODUCTS AND WORK

5.1 PRODUCTS AND WORKMANSHIP

.1 Products and workmanship shall be:

.1 Of the respective kinds described in the Contract, and

.2 Subjected from time to time to such tests as the Owner may require at the place of manufacture, fabrication or preparation, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places.

.2 The Contractor shall:

.1 At his cost provide all things necessary for examining, measuring, and testing Products including labour, electricity, fuels, stores, apparatus and instruments, and

.2 Supply samples of materials, before incorporation in the Work, for testing as may be selected and required by the Owner.

5.2 COST OF SAMPLES

.1 All samples shall be supplied by the Contractor at his own cost if the supply thereof is provided for in the Contract.

5.3 COST OF TESTS PROVIDED FOR

.1 The cost of making any test shall be borne by the Contractor if such test is:

.1 Specified in the Contract to be performed by the Contractor, or

.2 In cases of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfill, specified in the Contract in sufficient detail to enable the Contractor to price or allow for the same in his Bid.

5.4 COST OF TESTS NOT PROVIDED FOR

.1 If the Owner requires any test which is not provided for in the Contract and such test shows the Products or workmanship not to be in accordance with the Contract, then the cost of such test shall be borne by the Contractor, but in any other case clause 5.4.2 shall apply.

.2 Where, pursuant to clause 5.4.1, this clause applies, the Owner shall determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount of any costs incurred by the Contractor, which shall be added to the Contract Price.

5.5 INSPECTION AND TESTING

.1 The Owner shall at reasonable times have access to the Site and to all workshops and places where Products are being manufactured, fabricated or prepared for the Work and the Contractor shall afford every facility for, and every assistance in, obtaining the right to such access.

.2 The Owner shall be entitled, during manufacture, fabrication or preparation to inspect and test the Products to be supplied under the Contract. If Products are being manufactured, fabricated or prepared in workshops or places other than those of the Contractor, the Contractor shall obtain permission for the Owner to carry out such inspection and testing in those workshops or places. Such inspection or testing shall not release the Contractor from any obligation under the Contract.

5.6 DATES FOR INSPECTION AND TESTING

.1 The Contractor shall agree with the Owner on the time and place for the inspection or testing of any Products as provided in the Contract. The Owner shall give the Contractor not less than 48 hours notice of his intention to carry out the inspection or to attend the tests. If the Owner does not attend on the date agreed, the Contractor may, unless otherwise instructed by the Owner, proceed with the tests. The Contractor shall forthwith forward to the Owner certified copies of the test results.

5.7 REJECTION

.1 If, at the time and place agreed in accordance with clause 5.6, Products are not ready for inspection or testing or if, as a result of the inspection or testing referred to in clause 5.5, the Owner determines that the Products are defective or otherwise not in accordance with the Contract, he may reject the Products and shall notify the Contractor thereof immediately. The notice shall state the Owner's objections with reasons. The Contractor shall then promptly make good the defect or ensure that rejected Products comply with the Contract. If the Owner so requests, inspection and testing of rejected Products shall be made or repeated under the same terms and conditions.

5.8 COST FOR INSPECTION AND TESTING

.1 All costs incurred by the Owner because of rescheduling, or undue delay of inspection and testing, and for which the Contractor is responsible, shall be determined by the Owner and shall be recoverable from the Contractor by the Owner.

5.9 INDEPENDENT INSPECTION

.1 Inspection and testing of Products to be carried out by the Owner may be delegated to an independent agency. Any such delegation shall be effected in accordance with clause 1.3 and for this purpose such independent agency shall be considered as an assistant of the Owner.

5.10 EXAMINATION OF WORK BEFORE COVERING UP

.1 The Contractor shall afford full opportunity for the Owner to examine and measure any part of the Work which is about to be covered up or put out of view and to examine exposed or excavated surfaces before any part of the Work is placed thereon. The Contractor shall give notice to the Owner whenever any such part of the Work or exposed or excavated surface is or are ready or about to be ready for examination and the Owner shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such part of the Work or of examining such surfaces.

5.11 UNCOVERING AND MAKING OPENINGS

.1 The Contractor shall uncover any part of the Work or make openings in or through the same as the Owner may from time to time instruct and shall reinstate and make good such part. If any such part has been covered up or put out of view after compliance with the requirement of clause 5.9 and is found to be executed in accordance with the Contract, the Owner shall determine the amount of the Contractor's costs in respect of such uncovering, making openings in or through, reinstating and making good, which shall be added to the Contract Price. In any other case all costs shall be borne by the Contractor.

5.12 REMOVAL OF IMPROPER WORK OR PRODUCTS

.1 The Owner shall have authority to issue instructions for:

.1 The removal from the Site, within such time or times as may be specified in the instruction, of any Products which, in the opinion of the Owner, are not in accordance with the Contract,

.2 The substitution of proper and suitable Products, and

.3 The removal and proper re-execution, notwithstanding any previous test thereof or progress payment therefore, of any work which is not in accordance with the Contract.

.2 In case of default by the Contractor in carrying out instructions pursuant to clause 5.12.1 within the time specified therein or, if none, within a reasonable time, the Owner may employ other persons or contract with other firms or corporations to carry out the same, and all costs consequent thereon or incidental thereto shall be determined by the Owner and shall be recoverable from the Contractor by the Owner.

6. COMMENCEMENT, COMPLETION, CONTRACT TIME AND DELAYS

6.1 COMMENCEMENT OF WORK

.1 The Contractor shall commence the Work as soon as is reasonably possible in accordance with the instructions contained in the Letter of Acceptance and other provisions of the Contract. Thereafter, the Contractor shall proceed with the Work without delay.

6.2 POSSESSION OF SITE AND ACCESS TO SITE

.1 If the Contractor suffers delay or incurs costs from failure of the Owner to give possession of the Site or part thereof in accordance with the provisions of the Contract, the Owner shall determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount of such costs, which shall be added to the Contract Price.

.2 The Contractor shall bear all costs and charges for special or temporary rights-of-way required by him in connection with the Work. The Contractor shall also provide at his own cost any additional facilities outside the Site required by him for the purposes of the Work.

6.3 CONTRACT TIME

.1 The Contractor shall achieve Substantial Performance of the Work as a whole within the Contract Time.

.2 When the Contractor is required to achieve Substantial Performance of part or parts of the Work prior to achieving Substantial Performance of the Work as a whole, the Contractor shall achieve Substantial Performance of such part or parts of the Work within the time or times specified and such time or times shall be considered to be the Contract Time or Times for such part or parts.

6.4 EXTENSION OF CONTRACT TIME

.1 In the event of:

.1 A change in the Work made under clause 8.1, or

.2 Any cause of delay referred to in the Contract, or

.3 Abnormally adverse weather conditions, abnormal weather being defined as temperature, precipitation, humidity or wind that is outside of plus or minus one standard deviation from the mean, for the time period in question, determined pursuant to clause 4.5, or

.4 Any delay, impediment or prevention by the Owner, or

.5 Other special circumstances which may occur, other than through a default of or breach of Contract by the Contractor or for which he is responsible, being such as to affect an activity on the critical path of the Contractor's schedule, the Owner shall determine the extension of the Contract Time for the whole or part of the Work, to which the Contractor may be entitled.

6.5 CONTRACTOR TO PROVIDE NOTIFICATION AND DETAILS

.1 The Owner shall not be bound to make any determination pursuant to clause 6.4 unless the Contractor has:

.1 Within 7 days after such event has first arisen notified the Owner, and

.2 Within 14 days, or such other reasonable time as may be agreed by the Owner after such notification, submitted to the Owner details of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time.

6.6 INTERIM DETERMINATION OF EXTENSION OF TIME

.1 Where an event has a continuing effect such that it is not practicable for the Contractor to submit details within the period of 14 days referred to in clause 6.5.1.2, he may claim for an extension of time provided that he has submitted to the Owner interim details at intervals of not more than 14 days and final details within 14 days of the end of the effects resulting from the event. On receipt of such interim details, the Owner may make an interim determination of extension of time and, on receipt of the final details, the Owner shall review all the circumstances and may determine an overall extension of time in regard to the event. No final review shall result in a decrease of any extension of time already determined by the Owner. The Owner may determine an extension of the Contract Time notwithstanding that the Contract Time may have passed without being extended.

6.7 RATE OF PROGRESS

.1 If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Work or any part is at any time, in the opinion of the Owner, too slow to comply with the Contract Time, the Owner may notify the Contractor who shall immediately take such steps as are necessary, subject to the consent of the Owner, to expedite progress so as to comply with the Contract Time. The Contractor shall not be entitled to any additional payment for taking such steps. If any steps, taken by the Contractor in meeting his obligations under this clause, involve the Owner in additional costs, such costs shall be determined by the Owner and shall be recoverable from the Contractor by the Owner.

6.8 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 When the whole of the Work has been substantially performed and any pre-requisites to Substantial Performance of the Work prescribed by the Contract have been met, the Contractor may so submit to the Owner a Certificate of Substantial Performance, accompanied by a written undertaking to finish without delay any outstanding work during the warranty period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Owner to accept or reject the Certificate of Substantial Performance.

.2 The Owner shall, within 21 days after the date of receipt of the certificate referred to in clause 6.8.1, either issue to the Contractor, a letter, stating the date on which, in his opinion, the Work was substantially performed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Owner's opinion, is required to be done by the Contractor before the acceptance of such certificate. The Owner shall also notify the Contractor of any defects in the Work affecting substantial performance that may appear after such instructions and before completion of the Work specified therein. The Contractor shall be entitled to receive such notification within 21 days after completion, to the satisfaction of the Owner, of the Work so specified and remedying all defects so notified. The Owner may specify the date for Total Performance of the Work in such notice.

6.9 SUBSTANTIAL PERFORMANCE OF PART OR PARTS OF WORK

.1 In accordance with the procedure set out in clause 6.8, the Contractor may submit a Certificate of Substantial Performance to the Owner in respect of any substantial part of the Permanent Work which has been substantially completed and which has been or will be occupied or used by the Owner or an Other Contractor prior to Substantial Performance of the Work as a whole, whether or not such prior occupation or use is provided for in the Contract.

6.10 TOTAL PERFORMANCE OF THE WORK

.1 When the whole of the Work has been totally performed and any pre-requisites to Total Performance of the Work prescribed by the Contract have been met, the Contractor may so submit written notice to the Owner. Such notice shall be deemed to be a request by the Contractor for the Owner to issue a Certificate of Total Performance of the Work.

.2 The Owner shall, in accordance with the procedure set out in clause 6.8.2, either issue a Certificate of Total Performance of the Work or give instructions.

6.11 WARRANTY PERFORMANCE OF THE WORK

.1 The Work of the Contract shall only be considered as completed when a Certificate of Warranty Performance of the Work has been signed by the Owner and delivered to the Contractor, stating the date on which the Contractor has completed his obligations to execute and complete the Work and remedy any defects therein to the Owner's satisfaction. The Certificate of Warranty Performance of the Work shall be given by the Owner within 28 days after the expiration of the warranty period, or, if different warranty periods are applicable to different parts of the Permanent Work, the expiration of the latest such period, or as soon thereafter as any Work instructed, pursuant to clause 7, has been completed to the satisfaction of the Owner.

6.12 ACCELERATION

.1 If the Owner wishes to reduce the Contract Time for the Work or any part thereof, he shall issue to the Contractor a notice thereof and an instruction requiring the Contractor to submit to him within the period specified in the instruction:

.1 The Contractor's priced proposals for reducing the Contract Time, together with any consequential modifications to the construction schedule, or

.2 The Contractor's explanation why he is unable to reduce the Contract Time.

.2 If the Owner accepts the Contractor's proposals submitted pursuant to clause 6.12.1.1, including amendments thereto agreed by both parties, the Owner shall issue instructions to the Contractor modifying the Contract accordingly. Such instructions shall include:

.1 The revised Contract Time or Times,

.2 The modifications to the construction schedule,

.3 The revised Contract Price, and

.4 Any other relevant modifications to the Contract.

.3 The Contractor may at any time submit to the Owner proposals to reduce the Contract Time for the Work or part thereof. The Owner shall consider such proposals and if he accepts them he shall take action as in clause 6.12.2.

6.13 COVID-19 PANDEMIC RESPONSE AND MITIGATION

.1 The Contractor and the Owner acknowledge the presence of the COVID-19 virus in Canada and other jurisdictions forming part of the supply chain for materials and labour required for the Project (the “COVID-19 Pandemic”).

.2 Known Impacts – The consequences and impacts of the COVID-19 Pandemic existing as of the date of this Contract include, without restriction:

.1 Orders, directives and recommendations of any government authority issued up to and including the date of this Contract, and respecting public health or other requirements related to response to and prevention of infection by the COVID-19 virus;

.2 impacts to availability of labour or materials required in order to carry out the Work, arising from the COVID-19 Pandemic;

.3 the impacts of the Province of British Columbia withdrawing or deferring the advancement of any or all portions of their committed funding to the Project;

.4 the impacts of self-isolation/quarantine or regulated quarantine as ordered by the Province of British Columbia;

(the "**Known Impacts**"), and are known to the Contractor and to the Owner, and have been accounted for by the Contractor within the construction schedule, as well as the Contract Price.

.3 Notwithstanding anything contained within the Contract, the Contractor and the Owner covenant and agree as follows:

.1 no extension of the Contract Time or schedule shall be made and no adjustment to the Contract Price shall be made due to any Known Impacts.

.2 for greater clarity and without limiting the generality of clause 6.14.3.1,

.1 the Contractor shall not be entitled to any reimbursement of any costs and expenses incurred by the Contractor necessitated by a suspension or delay under clause 12 where the suspension is due to any Known Impacts;

.2 notwithstanding anything contained within clause 12, a suspension of the Work because of any Known Impacts whether ordered by the Owner or the Owner's Representative or not, shall not be deemed to be a suspension of the Work within the meaning of clause 12;

.3 notwithstanding anything contained within clause 6, no extension of the Contract Time shall be made and no adjustment in the Contract Price shall be made for any delay caused by a compliance with any order, directive or recommendation of any government authority related to the COVID-19 Pandemic, and/or caused by any other Known Impacts, whether ordered by the Owner or the Owner's Representative or not;

.4 notwithstanding anything contained within clause 6, no extension of Contract Time shall be made and no adjustment in the Contract Price shall be made for any delay Claim that is based on the concept of the cumulative impact of any Known Impacts;

.5 no extension of the Contract Time shall be made and no adjustment to the Contract Price shall be made due to any requirement that an employee of the Contractor or any Subcontractor self-isolate or quarantine as a result of a diagnosis or potential diagnosis as being COVID-19 positive;

.3 Any Claims for adjustment in the Contract Price arising from or related to the COVID-19 Pandemic shall be net of any and all compensation schemes, support programs or other financial aids made available to the Contractor by any government authority.

7. WARRANTY

7.1 WARRANTY PERIOD

.1 In the Contract the term "warranty period" shall mean a period of one (1) year, or such longer period as may be provided elsewhere in the Contract, calculated from:

.1 The date of Substantial Performance of the Work, certified by the Owner in accordance with clause 6.8, or

.2 In the event of more than one certificate having been issued by the Owner under clause 6.9, the respective dates so certified, or

.3 In the case of outstanding work to be completed after the date or dates of Substantial Performance referred to in clauses 7.1.1.1 and 7.1.1.2, the date upon which such work is certified as complete by the Owner, and in relation to the warranty period the term "the Work" shall be construed accordingly.

7.2 COMPLETION OF OUTSTANDING WORK

.1 The Contractor shall complete work outstanding at the date of Substantial Performance of the Work within the time specified by the Owner in the Certificate of Substantial Performance of the Work.

7.3 REMEDYING DEFECTS

.1 The Contractor shall, during or as soon as practicable after the expiration of the warranty period, remedy any defects in the Work and execute any work of modification or reconstruction related thereto, as the Owner may, during the warranty period or within 14 days after its expiration instruct the Contractor to do.

.2 Work referred to in clause 7.3.1 shall be executed by the Contractor at his own cost if the necessity thereof is, in the opinion of the Owner, due to:

.1 Defects in Products or workmanship, or defects in design for which the Contractor is responsible,

.2 The neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Owner, such necessity is due to any other cause, he may determine an addition to the Contract Price in accordance with clause 8.

7.4 CONTRACTOR'S FAILURE TO CARRY OUT INSTRUCTIONS

.1 If the Contractor defaults in carrying out instructions issued pursuant to clause 7.2 or 7.3, the Owner may employ other persons or contract with other firms or corporations to carry out the same. If such work is work, which, in the opinion of the Owner, the Contractor was liable to do at his own cost, then all costs consequent thereon or incidental thereto shall be determined by the Owner and shall be recoverable from the Contractor by the Owner.

7.5 CONTRACTOR TO SEARCH

.1 If any defect in the Work appears at any time prior to the end of the warranty period, the Owner may instruct the Contractor to search for the cause thereof. If such defect is one for which the Contractor is liable, the cost of the work carried out in searching shall be borne by the Contractor and he shall in such case remedy such defect at his own cost in accordance with the provisions of clauses 7.3 and 7.4. If such defect is one for which the Contractor is not liable under the Contract, the Owner shall determine the amount of the costs of such search incurred by the Contractor, which shall be added to the Contract Price.

8. CHANGES AND VARIATIONS

8.1 CHANGES IN THE WORK

.1 Consistent with the Work, the Owner may make changes in the Work or any part thereof, and he shall have the right to instruct the Contractor to make such changes and the Contractor shall make such changes, which may include:

.1 Increasing or decreasing the quantity of any work included in the Contract,

.2 Omitting any work, but not if the omitted work is to be carried out by the Owner or by an Other Contractor except by reason of the Contractor's default or negligence,

.3 Changing the character or quality or kind of any work,

.4 Changing the levels, lines, position and dimensions of any part of the Work,

.5 Executing additional work of any kind necessary for the completion of the Work,

.6 Changing any specified sequence or timing of construction of any part of the Work.

.2 No such change shall invalidate the Contract, but the effect, if any, of such changes on the Contract Price shall be valued in accordance with clause 8.3 and any extension of the Contract Time shall be determined in accordance with clause 6.4. Where an instruction to change the Work is necessitated by default or negligence of the Contractor or for which he is responsible, any cost and time attributable to such default or negligence shall be borne by the Contractor.

8.2 INSTRUCTIONS FOR CHANGES IN THE WORK

.1 The Contractor shall not make any changes in the Work without a written instruction from the Owner.

.2 No instruction shall be required for:

.1 An increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this clause, but is the result of quantities exceeding or being less than those stated in the Schedule of Prices, and

.2 A change or adjustment in lines, levels, grades or elevations when such change or adjustment is already provided for in the Contract.

8.3 VALUATION OF CHANGES IN THE WORK

.1 Changes referred to in clause 8.1 and any changes to the Contract Price which are required to be determined in accordance with this clause (for the purposes of this clause referred to as "changed work"), shall be valued, at the Owner's option:

.1 At the rates and prices set out in the Contract if, in the opinion of the Owner, these are applicable, or

.2 If the rates and prices set out in the Contract are not applicable to the changed work, at rates and prices deduced or extrapolated from such rates and prices, or

.3 By acceptance by the Owner of rates and prices submitted by the Contractor or other rates and prices as may be agreed by negotiation, or

.4 By acceptance by the Owner of a lump sum quotation submitted by the Contractor or other lump sum as may be agreed by negotiation, or

.5 As Cost Plus Work in accordance with the provisions of Section 00630 – Payment Conditions.

.2 If there is disagreement on the value of changed work, the Owner shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly. Until such time as rates or prices are agreed or fixed, the Owner shall determine provisional rates or prices to enable on-account payments to be made in accordance with the payment conditions of the Contract.

8.4 IMPACT OF CHANGES IN THE WORK

.1 If in the opinion of the Owner or the Contractor the nature or amount of any changed work relative to the nature or amount of the whole of the Work or to any part thereof, is such that the rate or price contained in the Contract for any item of the Work is, by reason of such changed work, rendered inappropriate or inapplicable, then, after due consultation by the Owner with the Contractor, a suitable rate or price may be agreed upon between the Owner and the Contractor.

.2 If there is disagreement on the rates or prices referred to in clause 8.4.1, the Owner shall fix such rate or price as is, in his opinion, appropriate and shall notify the Contractor. Until such time as rates or prices are agreed or fixed, the Owner shall determine provisional rates or prices to enable on-account payments to be made in accordance with the payment conditions of the Contract.

8.5 QUANTITY VARIATIONS

.1 The quantities set out in the Schedule of Prices are approximate only and no claim shall be made by the Contractor against the Owner on account of any excess or deficiencies absolute or relative, in the same.

.2 The price or prices provided in the Contract whether stipulated sum or unit price or both shall be accepted by the Contractor, as full compensation for everything furnished and done by the Contractor under the Contract, including all Work required but not included in the items herein mentioned, and also for all loss or damages arising out of the nature of the Work or the action of the weather, elements, or any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all risks of every description connected with the Work, and for all expenses incurred by or in the consequence of any delay or suspension or discontinuance of the work as herein specified, and for well and faithfully completing the Work as provided in the Contract.

9. CHANGES IN COST AND REGULATORY REQUIREMENTS

9.1 INCREASE OR DECREASE IN COST

.1 Subject to clause 9.2, the Contract Price shall not be subject to any adjustment in respect of rise or fall in the cost of labour, Products or any other matters affecting the cost of execution of the Contract.

9.2 CHANGES IN REGULATORY REQUIREMENTS

.1 If, after the latest date for submission of Bids for the Contract, there is a change to any Regulatory Requirement, or a new Regulatory Requirement is introduced, which causes additional or reduced cost to the Contractor in the execution of the Contract, such additional or reduced cost shall be determined by the Owner and shall be added to or deducted from the Contract Price.

.2 When a Regulatory Requirement is changed or introduced during the period of time referred to in clause 9.2.1 but public notice thereof has been given by the applicable authority before the commencement of such period of time, the change or introduction shall be deemed to have occurred before the commencement of such period of time.

10. CLAIMS

10.1 NOTICE OF CLAIMS

.1 If the Contractor intends to claim any additional payment, he shall give notice of his intention to the Owner within 7 days after the event giving rise to the claim has first arisen.

.2 Upon the occurrence of the event referred to in clause 10.1.1, the Contractor shall take all reasonable measures required to mitigate any loss or damage, which may be incurred as a result of such event.

10.2 CONTEMPORARY RECORDS

.1 Upon the occurrence of the event referred to in clause 10.1, the Contractor shall keep such contemporary records as may reasonably be necessary to support any claim he may subsequently wish to make, including records of time and cost relating to labour, products, construction equipment and other resources used in the work. The Contractor shall permit the Owner to inspect all records kept pursuant to this clause and shall supply him with copies thereof as and when the Owner so instructs.

10.3 SUBSTANTIATION OF CLAIMS

.1 Within 14 days, or such other reasonable time as may be agreed by the Owner, of giving notice under clause 10.1, the Contractor shall send to the Owner an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based. Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Owner may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. In cases where interim accounts are sent to the Owner, the Contractor shall send a final account within 14 days after the end of the effects resulting from the event.

10.4 PAYMENT OF CLAIMS

.1 The Contractor shall be entitled to have included in any progress payment such amount in respect of any claims as the Owner may consider due to the Contractor. If information is insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such information may substantiate to the satisfaction of the Owner.

10.5 OBLIGATIONS TO AND CLAIMS OF THIRD PARTIES

.1 The Contractor shall, with respect to lawful obligations of and lawful claims against the Contractor or any Subcontractor arising from the Contract:

.1 Discharge such obligations of and satisfy such claims against the Contractor, and

.2 Ensure the discharge of such obligations of and the satisfaction of such claims against Subcontractors.

.2 The Contractor shall, when requested by the Owner, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in clause 10.5.1.

.3 If a third party sends written notice to the Owner of an undischarged obligation or unsatisfied claim referred to in clause 10.5.1, the Owner may, 30 days after giving written notice to the Contractor, and surety where applicable:

.1 Pay any amount that is due and payable to the Contractor pursuant to the Contract directly to the obligees of and the claimants against the Contractor or the Subcontractor, and

.2 Where security for payment of claims has been provided in the form of a security deposit, the Owner may deduct such amount from the security deposit, or

.3 Where a security deposit has not been provided or insufficient monies are available in the security deposit, the Owner may deduct such amount, or portion thereof, from the amount payable to the Contractor under the Contract.

.4 Clause 10.5.3 shall apply only when written notice of the obligation or claim is sent to Owner as set out in the Builders' Lien Act.

10.6 CLAIMS AGAINST OWNER ONLY

.1 Any claims, demands or actions by the Contractor, arising out of alleged errors, omissions or misrepresentations in the Contract Documents or arising out of acts or omissions of the Owner's Representative or his assistants during the execution of the Work, shall be made only to or against the Owner. The Contractor waives any right to commence or carry on such claims, demands or actions against any person or party other than the Owner.

11. RELEASE FROM PERFORMANCE

11.1 FRUSTRATION

.1 If any circumstance outside the control of both the Owner and the Contractor arises after the award of the Contract which renders it impossible or unlawful for either party to fulfill his contractual obligations, then the Owner or the Contractor may terminate the Contract by giving seven calendar days notice, in writing, to the other party and, upon such notice, the Contract shall, except as to the rights of the parties under this clause and to the operation of clause 15, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

11.2 REMOVAL OF CONSTRUCTION EQUIPMENT ON TERMINATION

.1 If the Contract is terminated pursuant to clause 11.1, the Contractor shall remove from the Site all Construction Equipment.

11.3 PAYMENT IF CONTRACT TERMINATED

.1 If the Contract is terminated pursuant to clause 11.1, the Contractor shall be paid by the Owner, insofar as such amounts or items have not already been covered by payments on account made to the Contractor, for all Work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

.1 The cost of Products reasonably ordered for the Work which have been delivered in acceptable condition to the Contractor or of which the Contractor is liable to accept delivery, such Products becoming the property of the Owner upon such payments being made by him,

.2 The amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Work insofar as such expenditure has not been covered by any other payments referred to in this clause,

.3 Such proportion of the cost as may be reasonable, taking into account payments made or to be made for work executed, for removal of Construction Equipment under clause 11.2 provided that against any payment due from the Owner under this clause, the Owner shall be credited with any amounts which, at the date of termination, were recoverable by the Owner from the Contractor.

.2 Any amount payable under this clause shall be determined by the Owner.

12. SUSPENSION AND TERMINATION BY OWNER

12.1 SUSPENSION OF WORK

.1 The Contractor shall, on the instructions of the Owner, suspend the progress of the Work or any part thereof for such time and in such manner as the Owner may consider necessary and shall, during such suspension, properly protect and secure the Work or such part thereof so far as is necessary in the opinion of the Owner. Clause 12.2 shall apply unless such suspension is:

.1 Otherwise provided for in the Contract, or

.2 Necessary by reason of some default of or breach of contract by the Contractor or for which he is responsible, or

.3 Necessary by reason of normal weather conditions on the Site, or

.4 Necessary for the proper execution of the Work or for the safety of the Work or any part thereof, except to the extent that such necessity arises from any act or default by the Owner, in which case such suspension shall be at the Contractor's expense.

12.2 OWNER'S DETERMINATION FOLLOWING SUSPENSION

.1 Where, pursuant to clause 12.1, this clause applies the Owner shall determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount, which shall be added to the Contract Price, in respect of the cost incurred by the Contractor by reason of such suspension.

12.3 SUSPENSION LASTING MORE THAN 91 DAYS

.1 If the progress of the Work or any part thereof is suspended on the written instructions of the Owner and if permission to resume work is not given by the Owner within a period of 91 days after the date of suspension then, unless such suspension is the Contractor's responsibility pursuant to clauses 12.1.1.1 to 12.1.1.4, the Contractor may give notice to the Owner requesting permission, within 28 days from the receipt thereof, to proceed with the Work or that part thereof in regard to which progress is suspended. If, within such time, such permission is not granted, the Contractor may elect to treat the suspension, where it affects only part of the Work, as an omission of such part under clause 8.1 by giving a further notice to the Owner to that effect, or, where it affects the whole of the Work, treat the suspension as an event of default by the Owner and terminate the Contract in accordance with the provisions of clause 14, in which case the provisions of clauses 14.2 and 14.3 shall apply.

12.4 TERMINATION OF CONTRACT

.1 The Owner may terminate the Contract at any time by giving seven calendar days notice, in writing, of termination to the Contractor. When such a notice is received by the Contractor he shall, subject to the provisions of such notice, forthwith cease all operations in performance of the Contract.

.2 If the Owner terminates the Contract pursuant to clause 12.4.1, the Owner shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of clause 14.

13. DEFAULT OF CONTRACTOR

13.1 DEFAULT

.1 If the Contractor:

.1 Is deemed by law unable to pay his debts as they fall due, or becomes insolvent, or

.2 Enters into voluntary or involuntary bankruptcy, liquidation or dissolution (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or

.3 If any act is done or event occurs with respect to the Contractor or his assets which, under any applicable law, has a similar effect to any of the foregoing, or if he

.4 Has contravened clause 2.1, or

.5 Has repudiated the Contract, then the Owner may, upon written notice, enter upon the Site and the Work and immediately terminate the Contractor's right to continue with the Work.

.2 If the Owner determines, that, in his opinion, the Contractor without reasonable excuse:

.1 Has failed to commence and proceed with the Work or any part thereof in accordance the provisions of the Contract, or

.2 Has failed to comply with a notice issued pursuant to clause 6.7 or an instruction issued pursuant to clause 6.12 within 14 days after receiving it, or

.3 Despite previous warning from the Owner, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the Contract, or

.4 Has contravened clause 2.2, or

.5 Has failed to attain Substantial Performance of the Work or part or parts of the Work within the Contract Time or Times pursuant to clause 6.3, then the Owner may, after giving 14 days notice to the Contractor, and unless the Contractor has within such period remedied the default, enter upon the Site and the Work and terminate the Contractor's right to continue with the Work in whole or in part.

.3 If the Owner terminates the Contractor's right to continue with the Work, in whole or in part, pursuant to clause 13.1.1 or clause 13.1.2, such termination shall not release the Contractor from any of his obligations or liabilities under the Contract, and shall not affect the rights and authorities conferred on the Owner by the Contract, and the Owner may complete the Work or part thereof, or may contract with any Other Contractor to complete the Work or part thereof. The Owner or such Other Contractor may use for such completion so much of the Construction Equipment, Temporary Work and Products as he or they may think proper.

13.2 VALUATION AT DATE OF TERMINATION

.1 The Owner shall, as soon as practicable after any entry and termination by the Owner pursuant to clause 13.1, determine:

.1 What amount (if any) had, at the time of such entry and termination, been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract, and

.2 The value of any unused or partially used Products, any Construction Equipment and any Temporary Work.

13.3 PAYMENT AFTER TERMINATION

.1 If the Owner terminates the Contractor's right to continue with the Work in whole or in part under clause 13.1, he shall not be liable to pay to the Contractor any further amount in respect of the Contract until the expiration of the warranty period and thereafter until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any) and all other expenses incurred by the Owner have been determined. The Contractor shall then be entitled to receive only such sum (if any) as the Owner may determine would have been payable to him upon due completion by him after deducting the said amount. If such amount exceeds the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Owner the amount of such excess and it shall be deemed a debt due by the Contractor to the Owner and shall be recoverable accordingly.

13.4 ASSIGNMENT OF BENEFIT OF AGREEMENT

.1 The Contractor shall, if so instructed by the Owner within 14 days of the entry and termination referred to in clause 13.1, assign to the Owner the benefit of any agreement for the supply of any goods or materials or services and/or for the execution of any work for the purposes of the Contract, which the Contractor may have entered into.

14. DEFAULT OF OWNER

14.1 FAILURE OF OWNER TO PAY

.1 If the Owner fails to pay to the Contractor any amount due under the Contract within 28 days after the expiry of the time stated in the Payment Conditions within which payment is to be made, the Contractor may terminate the Contract by giving notice to the Owner. Such termination shall take effect 14 days after the giving of such notice unless payment is received within such period.

14.2 REMOVAL OF CONSTRUCTION EQUIPMENT

.1 Upon the termination of the Contract referred to in clause 14.1, the Contractor shall remove promptly from the Site all Construction Equipment.

14.3 PAYMENT ON TERMINATION

.1 In the event of termination pursuant to clause 14.1 the Owner shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of clause 11, but, in addition to the payments specified in clause 11.3, the Owner shall pay to the Contractor the amount of any loss or damage, including reasonable profit, to the Contractor directly arising out of or in connection with or by consequence of such termination.

14.4 CONTRACTOR MAY SUSPEND WORK

.1 As an alternative to termination under clause 14.1 but without prejudice to the Contractor's entitlement to terminate under clause 14.1, the Contractor may, after giving 14 days' prior notice to the Owner, suspend work or reduce the rate of work.

.2 If the Contractor suspends or reduces the rate of work pursuant to clause 14.4.1 and thereby suffers delay or incurs cost the Owner shall determine:

.1 Any extension of time to which the Contractor is entitled under clause 6.4, and

.2 The amount of such costs, which shall be added to the Contract Price.

14.5 RESUMPTION OF WORK

.1 When the Contractor suspends work or reduces the rate of work pursuant to clause 14.4.1 and the Owner subsequently pays the amount due, the Contractor's entitlement under clause 14.1 shall, if notice of termination has not been given, lapse and the Contractor shall resume normal working as soon as is reasonably possible.

15. SETTLEMENT OF DISPUTES

15.1 DISPUTES

.1 If a dispute of any kind arises between the Owner and the Contractor in connection with, or arising out of, the Contract or the execution of the Work, whether during the execution of the Work or after its completion and whether before or after repudiation or other termination of the Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Owner, the matter in dispute shall be settled in accordance with the provisions of this clause 15.

.2 Unless the Contract has already been repudiated or terminated, the Contractor shall, during the course of any dispute settlement, and without prejudice to any claim the Contractor may have:

.1 Proceed with the Work without delay, and

.2 Comply with any instructions issued by the Owner with respect thereto, unless and until such instructions are revised, as hereinafter provided, in a negotiated settlement or an arbitral or judicial award.

15.2 NOTICE OF DISPUTE

.1 A dispute shall be deemed to arise when the Owner or the Contractor serves on the other party a written notice of dispute stating the nature of the dispute. No notice of dispute shall be served by either party unless all other applicable provisions of the Contract have been invoked.

15.3 NEGOTIATED SETTLEMENT

.1 The Owner and the Contractor shall make bona fide efforts to settle any dispute arising between them by negotiations, in accordance with this clause 15.3, and provide timely disclosure of all relevant facts, information and documents to such negotiations.

.2 Within 14 days after the serving of a notice of dispute by one party on the other pursuant to clause 15.2, the parties shall commence negotiations for the purposes of settling the dispute. Such settlement process may include, if both parties agree, the use of mediation.

.3 If, after 28 days, or such longer period as the parties and the mediator, if any, may agree, after the commencement of negotiations pursuant to clause 15.3.2, the parties have not settled the dispute, it shall be referred to arbitration, unless the parties mutually agree otherwise.

15.4 MEDIATION

.1 If, in their efforts to reach a negotiated settlement, the parties agree to use mediation pursuant to clause 15.3.2, such mediation shall be conducted by a single mediator acceptable to both parties and under terms-of-reference established by both parties and the mediator. The parties shall share equally the cost of mediation.

15.5 ARBITRATION

.1 A reference to arbitration pursuant to clause 15.3.3 shall be effected by either party serving on the other party a notice to refer the dispute to arbitration and such dispute shall be referred to a single arbitrator agreed for that purpose or, in default of agreement within a reasonable time, appointed at the request of the Owner or the Contractor by the British Columbia Arbitration and Mediation Society.

.2 A reference to arbitration under this clause shall be a reference to which the Arbitration Act (British Columbia) applies and any award pursuant thereto shall bind the parties, except as otherwise provided by the Act.

END OF SECTION

1. SUPPLEMENTARY CONDITIONS

.1 These Supplementary Conditions provide information relative to specific items not covered in other sections.

2. WARRANTY PERIOD

.1 The Warranty Period for all work is One (1) Year.

3. INCIDENTAL ITEMS

.1 The following items are incidental to the contract and no separate payment will be made for this work:

.1 All submittals.

.2 All Site Restoration beyond the Limits of Work, which have been damaged or disturbed by the Work.

.3 Locating, protecting, and reconnecting where necessary all existing utilities (underground and overhead) and service connections, existing trees, fences, buildings, etc.

.4 Working in proximity to and crossing of utilities including BC One-Call notification, third party locations and hydrovacing / hand exposure as required.

.5 Public notification program.

.6 Road/lane closure and traffic control, providing access to existing residences, businesses or facilities as required or to provide nearby alternate parking.

.7 Cleaning and delivery of salvaged material removed during construction to the Owner's Public Works yard.

.2 The Owner will provide the work area and rights of access necessary for the construction of the Work under the Contract.

.3 The Owner will supply all materials as shown on the drawings.

.4 All Owner supplied materials will be delivered to the work site. The Contractor shall coordinate delivery of Owner supplied materials and shall be responsible for all loading, hauling and unloading of Owner supplied material.

.1 The following is a list of anticipated delivery dates for owner supplied materials.

Item
Cisco Meraki Routers – January 01, 2021
Internet Services – January 31, 2021
SCADA & PLC Programming – January 15, 2021

.2 Failure by the Owner to meet these deadlines will not be considered as a basis for financial claim against the Contract. The Contract deadline will be extended for the length of time that the Owner supplied materials are late.

4. EXISTING LANDSCAPE

.1 Minimize damage to trees, plants and shrubs during the course of construction.

.2 Attend to damaged trees, plants, or shrubs by qualified personnel.

5. OPERATION OF EXISTING WATER MAIN VALVES AND HYDRANTS

.1 Do not operate any existing water main valves and hydrants.

.2 The Owner's personnel shall operate all valves and hydrants only, unless specifically authorized otherwise.

.3 Advise the proper authorities and Fire Departments of hydrants, which will be out of commission so that alternate fire protection can be provided for.

6. SCADA SYSTEM IMPLEMENTATION

.1 This work involves upgrades to some existing PLC control systems. Perform and stage the work such that the installation is complete without disruption to the water supply to the WSA or operation of the existing PLC control system.

.2 PLC and control system upgrades schedule to be determined in conjunction with the Engineer and commissioning manager.

.3 Contractor to install the new PLC equipment in the control panel and proceed with associated wiring of the new PLC equipment as per the commissioning schedule approved by the commissioning manager. However, the Contractor shall not modify the existing PLC equipment or connect the new PLC equipment to the existing without written permission from the Owner's Representative, commissioning manager and the Owner's Representative programmer being on site.

.4 Contractor shall schedule the work with the Owner and Owner's Representative Twenty (20) days' in advance.

.5 No separate payment will be made for this work.

6. MAINTAINING EXISTING WATER SUPPLY

.1 The existing distribution water supply must be maintained in service at all times.

.2 Provide schedule of activities which may disrupt existing system at least fourteen (14) days prior to activities occurring. Submit schedule in the form of a written document for review.

.3 The scheduling of all disruptive activities must be approved by the Owner, together with the existing customers of the water supply system.

.4 Maintain any existing water supply facilities in operation under the function of the existing control system until the new control systems are capable of being operated on a full-time basis.

.5 When undertaking work at any of the WSA sub-systems (Madrona, Arbutus, Eagle Heights), work shall be performed at only one sub-system at a time. All other sub-systems must be entirely undisturbed and must remain fully functional while work is being completed within a sub-system.

.6 Maximum time period for which any existing station may be taken out of operation is 8 hours. The treated water distribution systems must remain functional to maintain community distribution supply even during any short term disruption of the station operation. Longer duration downtime will be considered by the owner only if there is financial benefit to shutdowns in excess of 8 hours. If this is the case, the contractor shall submit a financial comparison for the owners review and approval prior to the planned shutdown. No shutdown in excess of 8 hours is permitted without written approval from the owner.

.7 Subject to approval of the Owner, some equipment can be temporarily operated in HAND mode for short periods of time during automation upgrades. For the specified equipment, the Contractor is required to ensure that operability in HAND mode is available. Operating Staff must be available while existing automated systems are taken out of service for the proposed upgrades. Maximum time period for which the existing station automated control systems may be taken out of service is 72 hours during which time the new control systems must be implemented and made entirely operational. The capability to provide treated water supply pumping from the station during this time should not be interrupted.

.8 In order to maintain fire protection capability within the Community, the water level in any treated water storage reservoir cannot be allowed to fall below 50% of the total storage volume.

.9 Any activity that will involve disruption of water supply to commercial or industrial customers must be carried out during nighttime hours when these businesses are not active.

.10 Back up and contingency plans should be presented as part of the shutdown plans in order to outline a clear method of reverting to water delivery should the primary shutdown plan exceed allowable timeframes and capacities noted above.

.11 All shutdowns involving PLC or control panel changeovers should clearly define any auxiliary affected control systems including inter-PLC communications via polling or hardwired connections, and what the mitigation plans are for these dependencies.

END OF SECTION

1. GENERAL

1.1 WORK OF THE PROJECT

.1 Work of the Project, of which Work of this Contract is a part, comprises the following:

.1 Nanoose WSA SCADA Implementation

1.2 WORK OF THIS CONTRACT

.1 The main items of Work of this Contract include the following:

.1 Supply and Installation of SCADA Equipment at Water Stations

.2 The Site of the Work of this Contract is located in Nanoose, BC.

1.3 CONTRACT TIME

.1 The Contract will commence on the date on which the Letter of Acceptance is issued.

.2 Upon receipt of the Letter of Acceptance, promptly, and without undue delay, commence work at the Site.

.3 Attain Substantial Performance of the Work by March 31, 2021.

.4 Attain Total Performance of the Work by April 30, 2021.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 MEASUREMENT SYSTEM

.1 This section specifies the measurement rules that will generally be used for payment purposes unless otherwise specified in the Contract Documents. In case of conflict between the method of measurement specified in this section and the requirements specified in Section 01280 – Measurement Schedule, the latter will govern.

.2 Work will be measured in the International System of Units (SI) in accordance with CAN/CSA–Z234.1–89 Canadian Metric Practice Guide.

.3 When used in the Contract, the following abbreviations and symbols have the meaning assigned to them.

Abbreviation/Symbol	Meaning
µm	micrometre or micron
mm	millimetre
m	metre
mm^2 or mm2	square millimetre
m^2 or m2	square metre
ha	hectare
kPa	kilopascal
MPa	megapascal
m^3 or m3	cubic metre
L	litre
L.S.	lump sum
g	gram
kg	kilogram
N	newton
kN	kilonewton
t	tonne
no.	number (quantity)
min	minute (time)
h	hour
d	day
wk	week
%	percent
>	greater than
≥	greater than or equal to
<	less than
≤	less than or equal to
$	Canadian dollars
°	degree (angle)
°C	degree Celsius
vm	vertical metre
rpm	revolutions per minute
US gpm	US gallon per minute
gal	gallon
Btu	British thermal unit
VDC	volts of direct current
VAC	volts of alternating current
Ah	amp hour

1.2 METHOD OF MEASUREMENT

.1 Unless otherwise indicated in the Contract Documents:

.1 Earthwork materials will be measured net in place after compaction, with no allowance for bulking, shrinkage, compression, foundation settlement, or waste;

.2 Products will be measured net, with no allowance for waste;

.3 Dimensions used in calculating quantities will be rounded to the nearest unit of dimension as follows:

Quantity	Dimension
Volume of earth	centimetre
Volume of concrete	millimetre
Length of pipe	centimetre
Area of land	decimetre

.4 The survey station grid system adopted will be at 10 linear metres spacing on curves and 20 linear metres spacing on tangent sections for measuring earthwork quantities, respectively;

.5 Contours may be based on aerial photograph interpretation and are approximate only. Actual ground elevations and location co–ordinates will be determined in the field during the course of the Work for measurement purposes; and

.6 Measurement and payment will not be made for work carried out beyond measurement and payment lines and limits specified in the Contract Documents.

.2 When boundaries between different items of Work are not specified in the Contract Documents, such boundaries will be established by the Owner.

.3 Mass:

.1 Mass will be measured by weigh scale or by estimated or theoretical mass taken from reference documents, as specified.

.2 Mass will be measured to 3 decimal places.

.4 Length:

.1 Length will be measured at the item centreline or mean chord.

.2 Items to be measured by linear dimension will be measured parallel to the base or foundation upon which such items are placed.

.3 Items to be measured by station will be measured horizontal to the base or foundation upon which such items are placed.

.4 Centre line for pipes, ducts, culverts, and similar items will be the line equidistant between inside faces of pipe walls.

.5 Area:

.1 For rectangular and regular shaped objects, area will be measured using mean length and width or radius.

.2 For irregular objects, area will be measured by the sum of squares, triangles, and circles, etc., as selected by the Owner.

.6 Volume:

.1 Unless otherwise indicated, volume will be measured using mean length, width, and height or thickness.

.2 Excavation and fill volumes will be computed using a digital terrain modelling computer software program.

.7 Time:

.1 Construction Equipment to be paid for on a time basis will be measured in hours of actual working time, and necessary travelling time, when under its own power to the nearest tenth thereof.

.2 Hauling equipment to be paid for on a time basis will be measured in hours of actual working time to the nearest tenth thereof.

.8 Number of items will be measured on a per item basis.

.9 Lump Sum items will not be measured for payment.

.10 When standard manufactured items are identified by their physical characteristics, such characteristics will be considered as nominal. Unless more stringently controlled by specified tolerances, manufacturing tolerances established by the industry involved will be accepted.

1.3 MEASUREMENT COMPUTATION

.1 Formulae and computer programs used for measurement computation will be as specified or, when not specified, as selected by the Owner.

1.4 MEASUREMENT OF WORK

.1 Unless otherwise specified, the Owner will measure the Work for the purpose of determining payment to the Contractor.

.2 The Owner will request the Contractor to attend with the Owner in making measurements.

.3 If the Contractor does not attend pursuant to Paragraph 1.4.2, measurements made or approved by the Owner will be considered to be the correct measurement for such part of the Work.

.4 The Owner will prepare survey records and drawings for payment purposes as the Work progresses. The Owner will request the Contractor to attend, within 14 days, to examine and verify such records and drawings. If the Contractor does not attend to examine and verify such records and drawings, they will be considered to be correct.

.5 If, after attending pursuant to Paragraph 1.4.2 or 1.4.4, the Contractor disagrees with such measurements or records or drawings, they will nevertheless be considered correct until the Contractor notifies the Owner of the aspects in which they are considered incorrect. On receipt of such notice, the Owner will review the measurements or records or drawings and either confirm or vary them.

1.5 QUANTITIES

.1 Unless otherwise indicated, quantities specified in the Schedule of Prices for Unit Price Work are estimated quantities and will not be considered as actual quantities of Work to be performed. Subject to the Contract terms, unit prices stated in the Schedule of Prices will be applied to actual quantities of Work performed as measured in accordance with the Contract Documents.

.2 When it is stated that the Contractor will be paid only for the quantity specified for an item of Work, such quantity will be considered as a fixed quantity and the Contractor will be paid for the quantity specified, regardless of the actual quantity performed. If a change in the Work directed by the Owner results in a change in a fixed quantity, the quantity will be adjusted in accordance with the Contract Documents and payment will be made for the adjusted quantity.

1.6 SCALES

.1 Unless otherwise indicated, provide weigh scales, certified by Industry Canada, for measurement purposes.

.2 Provide scales that are accurate to within 0.5% of correct mass throughout the range of use. Spring balances will not be permitted.

.3 Prior to use and at any time requested by the Owner, provide the services of a qualified independent person, acceptable to the Owner, for the testing and servicing of weigh scales. Perform baseline tests and record results. Service and adjust weigh scales to meet requirements of Industry Canada and the Contract Documents. Submit a final report of weigh scale tests, services, and adjustments.

.4 Scales indicating more than true mass will not be permitted to operate and material measured subsequent to the last previous correct accuracy test will be reduced by the percentage of error in excess of 0.5%.

.5 Scales indicating less than true mass will be adjusted and no additional payment will be made for materials previously scaled and recorded.

1.7 SCHEDULE OF PRICES

.1 The Schedule of Prices is divided into items for purposes of measurement and payment of Work. Price each item in accordance with the methods of measurement specified in the Contract.

.2 Item names in the Schedule of Prices identify the work covered by the respective item, but do not define the size or nature of the unit.

.3 Read item names in the Schedule of Prices as part of the item scope, measurement, and payment requirements to which they apply in the Measurement Schedule.

.4 For each price specified in the Schedule of Prices include all costs and charges required to perform the Work including overhead charges and profit, and all costs of all related Work for which payment is not specified elsewhere.

.5 Subject to the provisions of the Contract Documents, the total amount of the Schedule of Prices shall cover all of the Contractor's obligations under the Contract and all matters and things necessary for performance of the Work in accordance with the Contract Documents.

.6 Payment will be made only for items specified in the Schedule of Prices. Costs and charges not directly provided for in the Schedule of Prices will be deemed to be included therein.

.7 Work or material included in any one item will not also be measured for payment under another item. No item will be paid for more than once.

.8 Omissions or errors in any item including quantities in the Schedule of Prices will not invalidate the Contract nor release the Contractor from any of his obligations or liabilities under the Contract.

1.8 LUMP SUM ITEMS

.1 Breakdown of Lump Sum Items

.1 If requested, submit to the Owner a breakdown of each Lump Sum item included in the Schedule of Prices, within 21 days after the commencement date of the Contract.

.2 Provide sufficient details as required by the Owner to identify the principal components of the Work and to permit ready valuation of Work performed.

.2 Lump Sum Items Paid in Accordance with a Schedule

.1 For Mobilization and Demobilization, Existing and Temporary Roads, and Care of Water, where payment of the respective Lump Sum amount will be made in accordance with a schedule as specified in Section 01280 – Measurement Schedule, the measurement of the completed Work by the Owner will include the amount of any work completed for Mobilization and Demobilization, Existing and Temporary Roads, and Care of Water.

1.9 SCHEDULE OF PRICES – DIVIDED BID ITEMS

.1 Where Divided Bid items are included in the Schedule of Prices or the Measurement Schedule, such items shall be excluded from the provisions for variations specified in the General Conditions.

.2 Include in the Unit Price for the first quantity of the divided item:

.1 Costs and profit for each unit of first quantity, and

.2 Contractor's fixed costs for the total quantity of the divided item specified in the Schedule of Prices plus additional quantities as specified in 1.9.4 Contractor's fixed costs shall include fixed costs for labour, Products, Construction Equipment, Temporary Work and overhead.

.3 Include in the Unit Price for the quantity of Work over the first quantity, hereinafter called the 'second quantity', cost and profit for each unit of Work, excluding fixed costs included in 1.9.2.2.

.4 Where the actual total quantity of the Divided Bid item is less than 120% of the estimated total quantity specified in the Schedule of Prices, the Unit Prices bid for the second quantity shall apply to all quantities in excess of the first quantity.

.5 Where the actual total quantity of the Divided Bid item is more than 120% of the estimated total quantity of the Divided Bid Item, the Contractor's fixed costs per unit of Work shall be calculated by the Owner as follows:

Fixed costs per Unit of work = ((FQUP – SQUP) x FQ)/ TQ

Where: FQUP – First Quantity Unit Price bid
SQUP – Second Quantity Unit Price bid
FQ – First Quantity in the Schedule of Prices
TQ – Total Quantity in the Schedule of Prices

Payment for the actual quantity which exceeds 120% of the total quantity in the Schedule of Prices shall be based on the Unit Price bid for the second quantity plus the fixed costs calculated by the Owner.

.6 The Unit Price for the second quantity of Work shall not exceed the Unit Price for the first quantity. Where a Unit Price for the second quantity of Work is greater in amount than the Unit Price for the first quantity, the Unit price and its extension will be corrected by the Owner to the Unit Price of the first quantity. Accordingly, the Bid will be evaluated and the Work will be paid for at the Unit Price of the first quantity. Contractor shall be bound to such corrected amounts.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

.1 Requirements specified in this Section apply to the scope and measurement of work for purposes of determining payment under the Contract.

2. MEASUREMENT SCHEDULE

2.1 EXTRA WORK ALLOWANCES

.1 Unforeseen Work:

.1 Scope: Includes unforeseen work for which payment is not included elsewhere. Unforeseen work shall be approved by Owner.

.2 Measurement: Shall be made by the Owner after assessment of the nature of the unforeseen work. Method of measurement, extent of work and the limit of work shall be agreed to prior to commencing the unforeseen work.

.3 Payment: Shall be made by an approved change order describing the unforeseen work and setting out the method of payment (ie. lump sum, unit price and/or force account). Payment amount shall be taken from the Extra Work Allowance provided for in the Contract.

2.2 SCHEDULE 'A' – NANOOSE WSA SCADA IMPLEMENTATION

.1 Mobilization/Demobilization – Division 0/1

.1 Scope: Includes preparatory work and operations including those necessary to the movement of material, labour and equipment to and from the project site. The item includes all other work or costs incurred prior to beginning the Work and following the completion of the Work on various items on the project site and all related work for which payment is not included elsewhere.

.2 Measurement: Mobilization and Demobilization will not be measured for payment.

.3 Payment: Payment for Mobilization and Demobilization will be as follows:

.1 When 5% of the original contract amount is earned, 25% of the lump sum bid for "Mobilization and Demobilization" will be paid.

.2 When 10% of the original contract amount is earned, 50% of the lump sum bid for "Mobilization and Demobilization" will be paid.

.3 When 25% of the original contract amount is earned, 60% of the lump sum bid for "Mobilization and Demobilization" will be paid.

.4 When 50% of the original contract amount is earned, 70% of the lump sum bid for "Mobilization and Demobilization" will be paid.

.5 Upon completion of all work on the Project, 100% of the lump sum bid for "Mobilization and Demobilization" will be paid.

The total payments for this item shall not exceed the original amount bid for this item regardless of the fact that the Contractor may have for any reason shut down his work on the project or moved equipment away from the project and then back again.

.2 Special Construction – Division 13

.1 Scope: Includes but is not limited to all labour, material and equipment to supply and install Control and Instrumentation – General, Instrumentation – Wiring, Instrumentation – Field Instruments, Instrumentation – Control Panels, Mimic Panels, Programmable Logic Controllers, Radio and SCADA Communications Systems and other related work for which payment is not included elsewhere.

.2 Measurement: This item will not be measured for payment.

.3 Payment: Lump Sum

.3 Electrical – Division 16

.1 Scope: Includes but is not limited to all labour, material and equipment to supply and install Basic Electrical Requirements, Existing Facilities, Basic Materials and Methods, Electrical Identification, Low Voltage Switching, Voice and Data Cabling and Voice and Data Cable testing other related work for which payment is not included elsewhere.

.2 Measurement: This item will not be measured for payment.

.3 Payment: Lump Sum

END OF SECTION

1. GENERAL

1.1 CO–ORDINATION

.1 Co-ordinate all construction activities to provide efficient and orderly construction of each and every part of the Work.

.2 Where construction of one part of the Work is dependent on construction of other parts, schedule and co–ordinate construction activities in the sequence needed to obtain the best results.

.3 Where availability of space is limited, co–ordinate construction of different parts of the Work to provide maximum accessibility for maintenance, service, and repair.

.4 Make adequate provisions to accommodate Work scheduled for later construction by Other Contractors or by the Owner's own forces.

1.2 COMMUNICATION EQUIPMENT

.1 Provide suitable computer equipment and software at the Contractor's office specified in this section for exchange of electronic data by e-mail of the following types of documents:

.1	Letters and Memos	Microsoft® Word
.2	Document Readers	Adobe Acrobat®Reader
.3	Schedules	Microsoft® Project
.4	Drawings	AutoCAD®
.5	Communication	Microsoft® Outlook

1.3 COMMUNICATION METHODS

.1 Communications will be sufficiently given by any one of the following methods:

.1 Delivered personally to the Contractor, the Contractor's representative, or left at the Contractor's address as specified in this section.

.2 Mailed at any post office to the Contractor's address as specified in this section.

.3 Couriered to the Contractor's address as specified in this section.

.4 Transmitted by facsimile to the Contractor's facsimile number as specified in this section.

.5 Transmitted by Internet to the Contractor's e-mail address as specified in this section.

1.4 CONTRACT ADMINISTRATION

.1 Co–ordinate scheduling and timing of administrative procedures with other construction activities to avoid delays and provide orderly progress of the Work. Administrative procedures include the following:

.1 Preparation and monitoring of schedules.

.2 Co–ordination of construction and removal of temporary facilities.

.3 Co–ordination, review, and processing of submittals.

.4 Participation in project meetings.

.5 Following Contract acceptance procedures.

.6 Preparation of change order proposals.

1.5 CONTRACTOR'S ADDRESS FOR CORRESPONDENCE

.1 Submit the name, address, telephone number, facsimile number, and e-mail address to be used for correspondence with the Contractor within 10 days of the date of commencement of the Contract. Update whenever information changes during the Contract.

1.6 OWNER'S ADDRESS FOR CORRESPONDENCE

.1 The Owner will provide to the Contractor the name, address, telephone number, facsimile number, and e-mail address to be used for correspondence with the Owner within 10 days of the date of commencement of the Contract. This information will be updated as required during the Contract.

1.7 CONTRACTOR'S REPRESENTATIVES AND SITE MANAGEMENT

.1 Submit an organization chart showing the names, positions, telephone numbers, and responsibilities and levels of authority for the Contractor's representatives and site management organization, within 10 days of the date of commencement of the Contract, and update whenever information changes during the Contract.

1.8 OWNER'S REPRESENTATIVES AND ASSISTANTS

.1 The Owner will provide to the Contractor an organization chart showing the names, positions, telephone numbers, and responsibilities and levels of authority for the Owner's Representative and assistants, within 10 days of the date of commencement of the Contract, and will update whenever information changes during the Contract.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 ADMINISTRATIVE RESPONSIBILITIES

.1 The Owner will be responsible for administrative requirements for the following Contract meetings:

.1 Pre–construction

.2 Construction Progress

.2 The Contractor shall be responsible for administrative requirements for the following Contract meetings:

.1 Workplace Orientation

.2 Safety

.3 The Owner or the Contractor may request additional meetings related to installation of equipment, commissioning progress, warranty, dispute resolution, environmental issues. Unless otherwise specifically requested by the Contractor, the Owner will be responsible for administrative duties related to these meetings. The agenda for these meetings may be combined with that of the construction progress meetings.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 The administrative requirements for Contract meetings include the following:

.1 Scheduling and administering the Contract meetings throughout the progress of the Work.

.2 Preparing the agenda for the meetings.

.3 Distributing to the relevant attendees written notice of each meeting and the proposed agenda at least 3 days in advance of the meeting date.

.4 Presiding at the meetings.

.5 Recording the minutes including attendance, significant proceedings and decisions, and action required by the parties.

.6 Reproducing and distributing copies of the minutes within 7 days after each meeting to the meeting participants and affected parties not in attendance.

.2 Representatives of the Contractor, Subcontractors, and Suppliers shall attend meetings as necessary and be authorized to act on behalf of the party each represents.

1.3 PRE–CONSTRUCTION MEETING

.1 Frequency: Within 15 days after award of the Contract and prior to commencement of activities at the Site.

.2 Purpose: To review personnel assignments, responsibilities, schedules, submissions, and administrative and procedural requirements.

.3 Attendees:

.1 Contractor's representatives: senior management, site superintendent, major Subcontractors, and others as necessary.

.2 Owner's representatives: as determined by the Owner.

.4 Agenda may include the following:

.1 Appointment of representatives of participants in the Work.

.2 Schedule of the Work and progress scheduling.

.3 Schedule of submittals.

.4 Requirements for temporary facilities, site signage, offices, storage sheds, utilities, and fences.

.5 Schedule of equipment delivery.

.6 Site safety and security.

.7 Contemplated changes, change orders, approvals required, costing and mark–up percentages permitted, time extensions, overtime, and administrative requirements.

.8 Products and materials provided by the Owner.

.9 Record documents.

.10 Maintenance manuals.

.11 Takeover procedures, acceptance, and warranties.

.12 Monthly progress claims, administrative procedures, and holdbacks.

.13 Inspection and testing.

.14 Insurance and transcripts of policies.

.15 Environmental management principles.

.16 Mobilization to the Site.

1.4 CONSTRUCTION PROGRESS MEETINGS

.1 Frequency: Twice monthly during the course of the Work, weekly during commissioning.

.2 Purpose: To monitor construction progress, to identify problems and actions required for their solution, and to expedite the Work.

.3 Attendees:

.1 Contractor's representatives: site superintendent and, when so requested by the Owner, Subcontractors, Suppliers, and other parties involved in the Work.

.2 Owner's representatives: as determined by the Owner.

.4 Agenda may include the following:

.1 Review and approval of minutes of the previous meeting.

.2 Review of the Work progress since the previous meeting.

.3 Field observations, problems, and conflicts.

.4 Problems that impede the construction schedule.

.5 Off–site fabrication delivery schedules.

.6 Corrective measures and procedures to regain the Contract schedule.

.7 Revisions to the construction schedule.

.8 Progress and schedule for the succeeding work period.

.9 Submittal schedules.

.10 Adherence to quality standards.

.11 Contemplated changes effect on the construction schedule and Contract Time.

.12 Contentious items of the Work.

.13 Contract closeout issues.

.14 Safety and security issues.

.15 Environmental issues.

.16 Other business.

1.5 WORKPLACE ORIENTATION MEETINGS

.1 Frequency: As required for all new workers prior to commencement of Work on the Site.

.2 Purpose: To familiarize new workers with site conditions, rules, regulations, safety, and security requirements.

.3 Attendees: All new Contractor and Owner personnel scheduled to work on the Site.

.4 Agenda may include the following:

.1 Project description including areas of work and other concurrent construction contracts.

.2 Hazardous areas including open excavations, construction equipment traffic, blasting, and chemical or explosive storage, etc.

.3 Safety equipment to be worn by workers, including areas with special requirements.

.4 Traffic routes on the Site.

.5 Evacuation procedures.

.6 First aid procedures.

.7 Excavation or work permit procedures.

.8 WHMIS (Workplace Hazardous Materials Information System) requirements for handling and storage of chemicals.

.9 Fire safety rules and regulations.

.10 Rules and regulations regarding wildlife, environmental concerns, drugs, alcohol, etc.

1.6 SAFETY MEETINGS

.1 Frequency: Weekly during the course of the Work for each area of work.

.2 Purpose: To review safety concerns and implement preventive safety measures.

.3 Attendees: Contractor's and Owner's personnel for each area of work.

.4 Agenda may include the following:

.1 Review and discussion of safety concerns, accidents, and "near misses."

.2 Remedial or preventive actions to be taken.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 FORMAT OF SCHEDULE

.1 Base the format of the Network Analysis Construction Progress Schedule, hereinafter referred to as the "NACP Schedule," on one of the following formats:

.1 Critical Path Method.

.2 Project Evaluation and Review Technique.

.2 Incorporate legends as required to identify symbols used.

.3 Incorporate appropriate time scales covering calendar and working days, months, and years.

.4 As a minimum requirement, indicate the earliest start date, earliest finish date, and total float time for each activity. Indicate work restriction and milestone dates, and the Contract Time specified in Section 01110 – Summary of Work. Clearly identify the critical path and first level sub–critical paths broken down by activity.

1.2 QUALITY OF SCHEDULE

.1 Prepare the NACP Schedule by personnel or organizations specializing in such work.

.2 Prepare the NACP Schedule using Microsoft Project.

.3 Include concise and appropriate activity descriptions.

.4 Separate the Contractor's workforce from the Subcontractors' workforces.

.5 Break down activities to provide a level of detail that enables ready interpretation and facilitates performance monitoring.

.6 Break down long duration activities and sub–activities that are continuous, repetitive, or sequential in nature, representing the actual construction activity planned. Include separate sub–network diagrams as appropriate.

1.3 SUBMITTALS

.1 Provide the following submittals.

.2 NACP Schedule including sub–network diagrams:

.1 An initial NACP Schedule, and required sub–network diagrams, for the Owner's review within 15 days after the date of commencement of the Contract.

.2 Within 15 days of receipt, the Owner will either return the submitted construction schedule to the Contractor with no exceptions taken or require revisions to the construction schedule. Provide a revised construction schedule within 7 days of receiving the Owner's comments, if any.

.3 Progress revisions within 7 days after receiving notice to do so from the Owner.

.4 Updated NACP Schedule within 5 days after the end of each month.

1.4 USE OF THE NACP SCHEDULE

.1 Adhere to, and require all Subcontractors and Suppliers to adhere to, the NACP Schedule.

.2 Requests for an extension to Contract Time will be based on the most recent accepted NACP Schedule.

1.5 PROGRESS REVISIONS

.1 Revise the NACP Schedule upon request by the Owner, if in the Owner's opinion:

.1 The progress of the Work is substantially different from the latest NACP Schedule and the date of Substantial Performance of the Work appears to be in jeopardy;

.2 The Work is being performed in a sequence that is not in keeping with the general work sequence of the latest NACP Schedule; or

.3 A revision is necessary to reflect a required adjustment to the Contract Time that has been authorized by the Owner.

.2 Outline methods to be used to complete the Work within the Contract Time.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 DEFINITIONS

.1 "Administrative Submittals" means data presented for review to ensure administrative requirements of the Contract are met.

.2 "Shop Drawings" means technical data specifically prepared for work of this Contract including drawings, diagrams, schedules, templates, patterns, and similar information not in standard printed form.

.3 "Product Data" means standard printed information describing materials, products, equipment, and systems not specifically prepared for work of this Contract. Product Data consisting of manufacturers' standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations, and descriptive data will be accepted in lieu of Shop Drawings provided that:

.1 Information not applicable to the work of this Contract is deleted; and

.2 Standard information is supplemented with information specifically applicable to the Work of this Contract.

.4 "Samples" means cuts or containers of materials or partial sections of manufactured or fabricated components that are physically identical to products proposed for use.

.5 "Field Samples" means volumes of materials as specified, which are physically representative of the materials proposed for use.

1.2 SCHEDULE OF SUBMITTALS

.1 Submittals required for the Contract are specified in each section of the Contract Documents.

.2 Submittals required by this section are appended to this section.

1.3 SUBMITTAL PREPARATION

.1 Determine and verify:

.1 Field measurements.

.2 Field construction criteria.

.3 Catalogue numbers and similar data.

.4 Compliance with the Contract Documents.

.2 Co–ordinate each submittal with requirements of the Work and the Contract Documents.

.3 Notify the Owner, in writing, on the submittal and at the time of submission, of any deviations from the requirements of the Contract Documents.

1.4 SUBMITTAL REQUIREMENTS

.1 Make submittals within the times required by the Contract Documents and sufficiently in advance of the date that reviewed submittals will be required, and in such sequence as to cause no delay in the Work.

.2 Make submittals in the form specified or in a form considered as an industry standard.

.3 Provide a transmittal letter with each submittal containing:

.1 Date.

.2 Project Name.

.3 Contract Name.

.4 Tender Number.

.5 Contractor's name and address.

.6 Number of each Shop Drawing, Product Data, and Sample submitted.

.7 Other pertinent data.

.4 Include in the submittals:

.1 Date and revision dates.

.2 Project Name.

.3 Contract Name.

.4 Tender Number.

.5 Name of:

.1 Contractor.
.2 Subcontractor.
.3 Supplier.
.4 Manufacturer.
.5 Name of detailer when details are not prepared by the Contractor, Subcontractor, or Supplier.

.6 The Contractor's stamp, signed, certifying its review of the submittal, verification of field measurements, and compliance with the Contract Documents, or that deviations, if incorporated, will be compatible with other elements of the Work.

1.5 REVIEW OF SUBMITTALS

.1 The Owner will review each submittal within 10 working days of receipt of the submittal unless specified otherwise in the Contract Documents.

.2 Make corrections or changes to reviewed submittals and resubmit as specified for the initial submission.

.3 Until a reviewed submittal is received, do not proceed with the Work related to the submittal.

.4 The Owner's review of any submittal does not relieve the Contractor from responsibility for errors and omissions, nor deviations from the requirements of the Contract Documents.

1.6 CASH FLOW FORECAST

.1 Submit to Owner for review, 15 days before submission of first application for payment, a forecast of approximate progress payments for the duration of the Contract.

.2 Submit revised cash flow forecasts of progress payments as the Work progresses and as requested by Owner.

1.7 LIST OF SUPPLIERS

.1 Submit a list of suppliers to Owner for review 15 days prior to commencement of activities at the Site.

.2 Submit revised list of suppliers as the work progresses and as requested by the Owner.

1.8 LIST OF CONSTRUCTION EQUIPMENT

.1 Submit a list of construction equipment to Owner for review 15 days prior to commencement of activities at the Site.

.2 Submit revised list of construction equipment as the work progresses and as requested by the Owner.

1.9 SCHEDULE OF WORKERS

.1 Not applicable.

1.10 SITE MANAGEMENT PERSONNEL

.1 Submit a list of site management personnel to Owner for review 15 days prior to commencement of activities at the Site.

.2 Submit revised site management personnel as the work progresses and as requested by the Owner.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

.1 Submit for review, shop drawings, product data and samples called for by the Contract Documents and for such other items as the Owner's Representative may reasonably request.

.2 Until submittal is reviewed, do not proceed with work involving the relevant product.

2. SHOP DRAWINGS

.1 Shop drawings means technical data specially prepared for work of this Contract; including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form.

.2 Present shop drawings in a clear and thorough manner to appropriately illustrate the work.

.3 Identify field dimensions on drawings.

.4 Identify shop drawings by appropriate references to sheet, detail, schedule or room numbers.

.5 Maximum drawing size: 860 × 1120 mm.

.6 Leave a clear space of 100 mm × 75 mm on each sheet of shop drawings for placement of Engineer's review stamp.

.7 Submit PDFs for each required shop drawing.

3. PRODUCT DATA

.1 Product data means standard printed information describing materials, products, equipment and systems; not specially prepared for work of this Contract, other than the designation of selections.

.2 Clearly mark product data to identify products.

.3 Manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and descriptive data will be accepted in lieu of shop drawings provided that:

.1 Information not applicable to work of this Contract is deleted, and

.2 Standard information is supplemented with information specifically applicable to the work of this Contract.

.4 Submit clear reproducible information in PDF format.

4. SAMPLES

.1 Samples means cuts or containers of materials or partial sections of manufactured or fabricated components which are physically identical to products proposed for use and which establish minimum standards by which the work will be judged.

.2 Label samples as to origin and intended use in the Work.

5. SUBMITTAL PREPARATION

.1 Review, date and sign, shop drawings, product data and samples, prior to submission.

.2 Determine and verify:

.1 Field measurements.

.2 Field construction criteria.

.3 Catalogue numbers and similar data.

.4 Conformance with Contract Documents.

.3 Coordinate each submittal with requirements of work and Contract documents. Individual drawings will not be reviewed until all related shop drawing and product data are available.

.4 Notify Owner’s Representative, in writing, on the submittal and at the time of submission, of deviations from requirements of Contract Documents.

6. SUBMISSION REQUIREMENTS

.1 Make submittals sufficiently in advance of date that reviewed submittals will be required and in such sequence as to cause no delay in the Work.

.2 Accompany submittals with transmittal letter, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Number of each shop drawing, product data and sample submitted.

.5 Other pertinent data.

.3 Submittals shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name of:

.1 Contractor.
.2 Subcontractor.
.3 Supplier.
.4 Manufacturer.
.5 Name of detailer when details not prepared by Contractor, sub-contractor, or supplier.

.4 Contractor's stamp, initialed or signed, certifying review of submittal, verification of field measurements, and compliance with Contract Documents.

.4 Make corrections or changes to rejected submittals and resubmit, as specified for initial submission.

7. RESPONSIBILITY FOR ERRORS, OMISSIONS AND DEVIATIONS

.1 Owner’s Representative's review of submittals does not relieve Contractor from responsibility for errors and omissions, nor deviations from requirements of the Contract Documents.

8. REPRODUCTION OF SUBMITTALS

.1 After final review, Owner’s Representative will reproduce at his expense, the number of copies he requires, and return reviewed reproducible documents. Contractor shall reproduce at his expense the number of copies required for performance of the Work.

END OF SECTION

1. GENERAL

1.1 ENVIRONMENTAL LEGISLATION

.1 Adhere to the latest editions of all applicable federal, provincial and municipal legislation, regulations and Codes of Practice concerning environmental protection and conduct activities in accordance with such legislation, codes and regulations. This includes but not necessarily limited to, the provincial Environmental Protection and Enhancement Act and Water Act; and the federal Fisheries Act and Navigable Waters Protection Act.

.2 In the event of conflicting statements between the various Acts, Authorizations, Permits, and Codes of Practice, the more stringent requirement shall apply.

.3 The Owner will obtain the environmental approvals, permits, licences, and authorizations required for the Project.

.4 Comply with the conditions of all environmental approvals, permits, licences and authorizations issued for the Contract. Obtain any further environmental approvals, permits, licences and authorizations for temporary work as may be required for the Contract.

.5 Provide the Owner with written confirmation of Contractor's full compliance with all approvals, permits, licences and authorizations before the Final Mobilization / Demobilization payment is released.

.6 Keep on Site copies of approvals, permits, licences and authorizations. Make these documents readily available to authorized persons at the Site. Keep documents on Site until the date of Warranty Performance of the Work or at such earlier dates accepted by the Owner.

1.2 GENERAL ENVIRONMENTAL PROTECTION REQUIREMENTS

.1 Reporting:

.1 Spills or releases of hazardous materials and any other substances that cause or could cause impairment of, or damage to the environment or human health or safety shall be immediately reported to the Owner as well as applicable Regulatory Agencies; and remediation measures undertaken as required and legislated.

.2 Silt Fence Management:

.1 Be responsible for and maintain silt fences until date of Warranty Performance of the Work.

.2 Inspect silt fencing at intervals appropriate to weather events. Based on inspections maintain silt fencing in functional condition, remove silt accumulations and dispose on site at locations acceptable to the Owner.

.3 Unless otherwise specified in the Contract Documents, or otherwise requested by the Owner, remove temporary silt fencing within 30 days after date of Warranty Performance of the Work.

.3 Waste Management:

.1 Remove construction waste, including demolition waste, from the Site unless otherwise specified. Dispose of such waste at the waste disposal facility identified in the Environmental Management Plan.

.2 Do not burn, bury or otherwise discharge construction or demolition waste on the Site unless specified otherwise.

.3 When practical, minimize the amount of waste generated from construction operations and demolitions by salvaging materials for recycling. Salvage and segregate metal, plastic, paper, cardboard, and glass and transfer them to the nearest appropriate collection facility.

.4 Hazardous Materials:

.1 Transport hazardous materials to and from the Site in accordance with Regulatory Requirements.

.2 Use and store hazardous materials in accordance with Regulatory Requirements.

.3 Take all reasonable measures to contain spills, remove spilled materials, and cleanup as required in accordance with the applicable legislation and regulations, at the contractor's expense.

.5 Handling of Construction Equipment Fuels and Lubricants:

.1 Employ persons qualified to handle construction equipment fuels and lubricants.

.2 Carry the following protection materials in all fuel and service vehicles:

.1 10 kg of suitable sorbant material.
.2 30 m^2 of 6 mil polyethylene.
.3 A shovel.
.4 An empty fuel barrel with the lid removed.

.3 Maintain a setback distance of 100 m between stored Construction Equipment fuels and lubricants and rivers, streams, and other surface bodies of water.

.4 Prevent handling and fuelling operations from contaminating the ground, surface water, and ground water. Use containment berms and an impermeable base course or other system during fueling operations, in order to contain possible spilled fuel.

.5 Clearly mark and barricade fuel storage areas and non-portable transfer lines. Use markers that are visible under all weather conditions.

.6 Store waste Construction Equipment lubricants in a tank or closed container, and dispose of off-site in accordance with the Regulatory Requirements.

2. PRODUCTS - NOT USED

3. EXECUTION - NOT USED

END OF SECTION

1. GENERAL

1.1 REGULATORY RESPONSIBILITY

.1 Conform to Regulatory Requirements and pay all fees and give all notices required by them.

.2 Obtain approvals necessary for the Work and the Contract from the regulatory agencies having jurisdiction, except those approvals obtained by the Owner as identified in this section.

.3 The Owner will obtain the approvals necessary for the Project that involve agreement between the Owner and the regulatory agency having jurisdiction.

1.2 VARIATIONS BETWEEN THE CONTRACT DOCUMENTS AND THE REGULATORY REQUIREMENTS

.1 If the Contract Documents are at variance with Regulatory Requirements, notify the Owner in writing, requesting direction, immediately after such variance becomes known.

.2 The Owner may make Changes in the Work due to Regulatory Requirements, and such changes will be authorized by Change Order and valued in accordance with Section 00725 – General Conditions, Article 8.3 – Valuation of Changes in the Work.

.3 If the Contractor fails to notify the Owner in writing and obtain the Owner's direction related to variations in Regulatory Requirements and performs work knowing it to be contrary to Regulatory Requirements, the Contractor accepts responsibility for correcting violations thereof, and bears the costs, expenses, and damages attributable to the Contractor's failure to comply with the provisions of such Regulatory Requirements.

1.3 CONTRACT DOCUMENTS

.1 Contractor shall not be responsible for verifying that Contract Documents comply with regulatory requirements. If Contract Documents are at variance therewith, or changes which require modification to Contract Documents are made to regulatory requirements, by authorities having jurisdiction, subsequent to date of tender closing, Contractor shall notify Owner's Representative in writing, requesting direction, immediately such variance or change becomes known to him. Owner's Representative may make changes required to Contract Documents and any resulting change in Contract Price or Contract Time will be made in accordance with the General Conditions of Contract.

.2 If Contractor fails to notify Owner's Representative in writing and obtain Owner's Representative's direction as required in paragraph 1.3.1 and performs work knowing it to be contrary to regulatory requirements, Contractor shall be responsible for and shall correct violations thereof and shall bear costs, expenses and damages attributable to his failure to comply with provisions of such regulatory requirements.

1.4 BUILDING CODE

.1 Conform to and perform work in accordance with the local jurisdiction Building Code, except as otherwise indicated in Contract Documents.

1.5 PERMITS

.1 Development Permit: Owner will apply for, obtain, and pay for development permit if required.

.2 Building Permit:

.1 Apply for, obtain and pay for building permit and other permits required for the Work and its various parts.

.2 Display the building permit and such other permits in a conspicuous location at the Place of the Work.

.3 Occupancy Permits:

.1 Where required by authority having jurisdiction, apply for, obtain, and pay for occupancy permits, including partial occupancy permits.

.2 Where Contract Document deficiencies are required to be corrected in order to obtain occupancy permits, including partial occupancy permits, Owner's Representative will issue appropriate instructions to correct the Work.

.3 Turn occupancy permits over to Owner's Representative.

2. PRODUCTS - NOT USED

3. EXECUTION - NOT USED

END OF SECTION

1. GENERAL

1.1 WORK SITE SAFETY – THIS CONTRACTOR IS "PRIME CONTRACTOR"

.1 For the purposes of the *Occupational Health and Safety Act* (British Columbia), and for the duration of the Work of this Contract:

.1 Be the "prime contractor" for the "work site"; and

.2 Do everything that is reasonably practicable to establish and maintain a system or process that complies with the Act and its regulations, and as required to provide for the health and safety of all persons at the "work site."

.2 Direct all Subcontractors, Sub–subcontractors, Other Contractors, employers, workers, and any other persons at the "work site" on safety related matters, to the extent required to fulfil "prime contractor" responsibilities pursuant to the Act, regardless of:

.1 Whether or not any contractual relationship exists between the Contractor and any of these entities; and

.2 Whether or not such entities have been specifically identified in this Contract.

1.2 SAFETY REQUIREMENTS

.1 Establish and maintain a system or process to provide for the safety for all persons at the Site during the Contract Time, including:

.1 The development and implementation of satisfactory safety plans for all aspects of work and the co-ordination of all plans;

.2 The establishment of a safety committee; and

.3 Conducting safety meetings and workplace orientation meetings.

.2 Communicate and co–operate on safety matters with the Owner and Occupational Health and Safety.

.3 Comply with federal, provincial, and municipal legislation, including the Workplace Hazardous Materials Information System.

.4 Rectify unsafe conditions, and be responsible for all related costs and delays.

.5 Advise the Owner as soon as possible of all accidents.

.6 Investigate any accident that causes injury, and complete accident forms and prepare accident reports.

.7 Provide and maintain a first aid room and equipment as required by the Occupational Health and Safety Regulations.

.8 Maintain first aid supplies, space, and trained personnel on Site as required by the Occupational Health and Safety Regulations.

.9 Have at least one qualified first aider on Site for each work shift.

1.3 SUBMITTALS

.1 Provide the following submittals.

.1 The name of the person responsible for supervision of the Contractor's safety plan at the Site prior to commencing Work at the Site.

.2 The names of workers qualified as first aiders prior to commencing Work at the Site including monthly updates.

.3 At the end of each month, a list of accidents including lost time injuries incurred for the month, and a cumulative summary of all accidents and total lost time including a comparison with the total work time since the start of the Contract.

.4 Completed accident forms and reports as soon as possible.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

.1 Indicate the number of Calendar Days required to complete the Work under the "Quantity" column within the Schedule of Prices and extend that number of days times the unit price per day as shown, to get the total bid for "Site Occupancy".

1.1 CALCULATION OF CALENDAR DAYS

.1 Calendar Days will be calculated as whole days. The assessment of calendar days will commence on the day of the first disturbance within the Limits of Construction. Thereafter, every day will be counted as a Calendar Day with the exception of when:

.1 Prohibited from working due to restrictions imposed by local bylaws after the Contract has been awarded or as a result of directives from the Owner.

.2 Scheduled employee time off, subject to the conditions specified herein.

.3 The project is delayed due to inclement weather subject to the conditions specified herein.

.4 The project is shutdown for the winter.

1.2 INCLEMENT WEATHER

.1 A day on which the Contractor is unable to work on site or works less than half of a normal working day for reasons of inclement weather, or conditions resulting from inclement weather, shall not be counted as a Calendar Day.

.2 On a day which the Contractor works less than a normal working day on site for reasons of inclement weather, but works at least half of a normal working day, that day will be counted as a Calendar Day.

.3 A normal working day shall comprise the average duration worked by the Contractor on the preceding 5 uninterrupted working days.

.4 Towing traffic or blading the road surface to facilitate the passage of traffic will not be considered as "work on site."

.5 Ripping, drying and/or re-laying materials to restore the material to the condition it was prior to the occurrence of inclement weather will also not be considered "work on site."

1.3 EXCLUSION FROM SITE OCCUPANCY

.1 The following items will be excluded from Site Occupancy:

.1 The maintenance of all roadways, accesses or temporary construction roads.

.2 The maintenance of care of water measures.

.3 The maintenance of environmental protection measures.

.4 The maintenance of traffic accommodation work.

.5 The maintenance of sewage bypass pumping.

1.4 CONCLUSION OF SITE OCCUPANCY

.1 Subject to the exceptions specified in this Section, assessment of Calendar Days will cease entirely on the effective date of Substantial Performance or Total Performance, as detailed in Section 01775.

1.5 STATEMENTS, EXTENSIONS AND GENERAL

.1 The Owner will, on a weekly basis, prepare a statement for the Contractor showing the number of Calendar Days worked on each schedule of work in the Contract during that period.

.2 In the event that the Contractor disagrees with the number of Calendar Days shown on the statement, within one week of the date of such statement, notify the Owner in writing of reasons for the disagreement, otherwise the number of Calendar Days shown on the statement shall be considered final.

.3 An increase in the number of Calendar Days to complete the Work will be considered for an increase in the quantities, design changes to the project or any other reason which in the opinion of the Owner is outside the control of the Contractor, or could not have been reasonably foreseen by the Contractor.

.4 If the Contractor believes there is an entitlement to an extension of the number of Calendar Days required to complete the Work, prior to the completion of the Work, submit a written request to the Owner setting out the reasons for the request, justifying the number of additional days required.

1.6 PAYMENT

.1 If the Contractor completes the Work in the exact number of days entered in the "Site Occupancy" bid item, no payment will be made.

.2 If the Contractor completes the Work in fewer Calendar Days than the number entered in the "Site Occupancy" bid item, a payment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days will be made.

.3 If the Contractor completes the Work in more than the number of Calendar Days entered in the "Site Occupancy" bid item, an assessment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days will be made and charged to the Contractor. This assessment will be deducted from any monies due the Contractor.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 REFERENCES

.1 Reference are made to standards as listed in the Specifications.

.1 Conform to these standards, in whole or in part, as required in the Specifications.

.2 Conform to the latest date of issue of the standards in effect on the date of the submission of bids, except where another date or issue is specified.

1.2 SUBMITTALS

.1 When requested by the Owner, a complete description of the procedures for installing the product.

.2 When requested by the Owner, appropriate design calculations for the products to be installed.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Inspect each shipment of products and timely replace any missing or damaged items.

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

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

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

2. PRODUCTS

2.1 PRODUCT QUALITY

.1 Provide products that conform to the Contract Documents, are new, not damaged or defective, and of the best quality (compatible with the Specifications) for the purpose intended. If requested by the Owner, furnish evidence as to the type, source, and quality of products provided.

.2 Defective products, whenever identified prior to the completion of the Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility from the Contractor, but provides a precaution against oversight or error.

.3 Unless otherwise indicated in the Contract Documents, maintain uniformity of manufacture for any particular or like items.

.4 Do not place permanent labels, trademarks, or nameplates on products in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

2.2 PRODUCT AVAILABILITY

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

.2 In the event of failure to notify the Owner's Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Owner's Representative reserves the right to substitute more readily available Products of similar character, at no increase in Contract Price.

3. EXECUTION

3.1 PRODUCT CONTROL

.1 Maintain an inventory of all products delivered to the Site and placed in temporary storage.

.2 Record the use of products during the course of construction.

.3 When requested by the Owner, provide inventory records for verification of quantities.

3.2 TRANSPORTATION, STORAGE, HANDLING AND PROTECTION

.1 Pay costs of transportation of products required in the performance of Work. This includes shipment of control system equipment to the Engineer's office for testing purposes after the control panels may have been manufactured.

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

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

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

.5 Store cementitious products clear of earth or concrete floors, and away from structures or undrained depressions.

.6 Store and handle miscellaneous steel products and reinforcing steel by methods such that materials are not contaminated by mud, soil, dust or other debris.

.7 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.8 Stockpile sand, gravel or processed granular materials on a well drained prepared pad with low exposure to dust accumulation.

.9 Store sheet materials and lumber in flat, solid supports and keep clear of ground. Slope to shed moisture.

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

3.3 INSTALLATION STANDARDS

.1 Unless otherwise specified in the Contract Documents, install products in accordance with the manufacturer's instructions. Do not rely on labels or enclosures provided with the products. Obtain written instructions directly from the manufacturers.

.2 Notify the Owner, in writing, of conflicts between the Contract Documents and the manufacturer's instruction, so that the Owner may establish a course of action.

3.4 REMEDIAL WORK

.1 Repair or replace the parts or portions of the Work identified by the Owner as defective or unacceptable.

.2 Retain specialists familiar with the products affected to perform remedial work in a manner that neither damages nor endangers any portion of the Work.

END OF SECTION

1. GENERAL

1.1 DEFINITIONS

.1 "Proprietary Specification" means a specification that lists one or more proprietary names of products or manufacturers and may also include descriptive language, references to standards, or lists performance requirements, or any combination thereof.

.2 "Non–proprietary Specification" means a specification that uses descriptive language, references to standards, or lists performance requirements, or any combination thereof, but does **not** include proprietary names of products or manufacturers.

.3 "Substitute Product" means a product not specified by proprietary name that may be acceptable in place of a product which is specified by proprietary name.

.4 "Substitute Manufacturer" means a manufacturer not specified by proprietary name that may be acceptable in place of manufacturer which is specified by proprietary name.

.5 "Substitution" means a Substitute Product or Substitute Manufacturer.

1.2 PRODUCT OPTIONS

.1 For products specified by Non–proprietary Specification:

.1 Select any product by any manufacturer that meets the requirements of the Contract Documents.

.2 For products specified by Proprietary Specification:

.1 Select any product or manufacturer named; or

.2 Select a substitute product or manufacturer in accordance with Article 1.3.

.3 For products specified by Proprietary Specification and accompanied by words indicating that substitutions will not be accepted:

.1 Select any product or manufacturer named; Substitutions will not be permitted.

1.3 SUBSTITUTIONS

.1 Where Substitute Products are permitted; unnamed products will be authorized by the Owner, subject to the following:

.1 Substitute Products shall be the same types as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the named product(s). Substitute Products shall not require revisions to the Contract Documents nor to work of Other Contractors.

.2 Do not order or install Substitutions without the Owner's authorization.

.3 If, in the Owner's opinion, a Substitution does not meet the requirements of the Contract Documents, provide a product that, in the Owner's opinion, does meet the requirements of the Contract Documents.

1.4 CHANGES TO AUTHORIZED PRODUCTS AND MANUFACTURERS

.1 Do not change products or manufacturers, authorized by the Owner for use in performance of the Work, without the Owner's written authorization.

.2 Submit requests to change authorized products and manufacturers to the Owner in writing, including the product data indicated in Article 1.5.

1.5 PRODUCT DATA

.1 When requested by the Owner, submit complete data substantiating compliance of a product with the requirements of the Contract Documents. Include the following:

.1 Product identification, including the manufacturer's name and address.

.2 Manufacturer's literature providing product description, applicable reference standards, and performance and test data.

.3 Samples, as applicable.

.4 Name and address of projects where the product has been used and the date of each installation.

.5 For Substitutions and requests for changes to authorized products, include, in addition to the above, the following:

.1 Itemized comparison of the substitution with the named product(s). List significant variations.

.2 Availability of maintenance services and sources of replacement products and parts.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

.1 Perform final cleaning operations prior to the request for inspection for Total Performance.

.2 Remove surplus products, tools, construction machinery, and equipment not required for the performance of the remaining Work prior to the request for inspection for Substantial Performance.

.3 Remove waste products and debris resulting from the Work of the Contractor, and leave the Work clean and suitable for use by the Owner.

.4 Repair, patch, and touch–up marred surfaces to match adjacent finishes.

.5 Clean up and dispose of all foreign matter including wire, posts, logs, branches, roots, rocks, and construction debris.

.6 Remove all temporary work.

.7 Clean and sweep all new and existing roadways affected by contract work.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 SUMMARY OF PROCESS

.1 A Contract acceptance process will be used to facilitate the Owner's acceptance of the Work. The process can be summarized as follows:

.1 Substantial Performance of the Work:

.1 Fulfilment of prerequisites to Substantial Performance.
.2 Inspection for Substantial Performance.
.3 Issuance of a Certificate of Substantial Performance.

.2 Total Performance of the Work:

.1 Fulfilment of prerequisites to Total Performance.
.2 Inspection for Total Performance.
.3 Issuance of a Certificate of Total Performance.

.3 Warranty Performance of the Work:

.1 Fulfilment of prerequisites to Warranty Performance.
.2 Inspection for Warranty Performance.
.3 Issuance of Certificate of Warranty Performance.

1.2 SUBSTANTIAL PERFORMANCE OF PART OF THE PERMANENT WORK

.1 When utilization of part of the Permanent Work is required and Substantial Performance of part of the Permanent Work is a condition of such utilization, the applicable requirements specified in this section will apply to the part of the Permanent Work to be utilized.

1.3 PREREQUISITES TO SUBSTANTIAL PERFORMANCE

.1 Prior to requesting the Owner's inspection for Substantial Performance carry out the following:

.1 Perform Initial Commissioning.

.2 Obtain and submit evidence of compliance with Regulatory Requirements.

.3 Remove from the Site temporary facilities along with construction tools, equipment, mock–ups, and similar items not required for the performance of the remaining work.

.4 Correct all Contract Deficiencies that may affect operation of the canal and structures.

.5 Complete the Work and have it ready for the purpose intended except for the parts of the Permanent Work specified in Articles 1.3.2 and 1.6.

.6 Review the Contract Documents and inspect the Work to confirm that prerequisites to Substantial Performance have been fulfilled and that the Work is ready for inspection for Substantial Performance.

.7 Submit product warranties and extended warranties when specified in the Contract Documents.

.8 Make final change–over of locks and transmit keys to the Owner.

.9 Complete installation of architectural finish items, including all mechanical and electrical covers and trims.

.2 Complete all work items such that the SCADA System can be used for the purpose intended. Work that does not have to be completed to obtain Substantial Performance follows:

.1 Final cleanup.

.2 Operation and maintenance manuals.

.3 Record drawings.

1.4 INSPECTION FOR SUBSTANTIAL PERFORMANCE

.1 Submit a written request to the Owner for inspection for Substantial Performance, certifying that prerequisites have been fulfilled and specifying known exceptions in the form of a list of items to be completed, corrected, or submitted.

.2 The Owner will, within a reasonable time after receipt of the Contractor's request:

.1 Proceed with the inspection; or

.2 Advise the Contractor that prerequisites are not adequately fulfilled.

.3 Results of the Owner's inspection for Substantial Performance will form the Substantial Performance Contract Deficiency List (SPC Deficiency List).

1.5 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Following inspection, the Owner will:

.1 Accept the Certificate of Substantial Performance of the Work stating the effective date of Substantial Performance, with a copy of the SPC Deficiency List attached; or

.2 Reject the Certificate of Substantial Performance and advise the Contractor that prerequisites to Substantial Performance are not fulfilled and repeat the inspection for Substantial Performance as necessary.

.2 Upon acceptance of a Certificate of Substantial Performance of the Work, the Owner will assume responsibility for care, custody, and control of the Work, including responsibility for the following:

.1 Facility operation, including all systems and equipment.

.2 Maintenance.

.3 Security.

.4 Property insurance.

.5 Utility costs.

1.6 PREREQUISITES TO TOTAL PERFORMANCE

.1 Prior to requesting the Owner's inspection for Total Performance, carry out the following:

.1 Perform the entire Work, including the correction of all Contract Deficiencies, including items listed in Article 1.3.2 and except those items arising from the warranty provisions of the Contract Documents.

.2 Review the Contract Documents and inspect the Work to confirm that prerequisites to Total Performance have been met and that the Work is ready for inspection for Total Performance.

1.7 INSPECTION FOR TOTAL PERFORMANCE

.1 Submit a written request to the Owner for inspection for Total Performance, including a copy of the Owner's most recent SPC Deficiency List, and certify that each Contract Deficiency has been corrected or otherwise resolved in a manner agreed to between the Owner and the Contractor. List known exceptions, if any, in the request.

.2 The Owner will, within a reasonable time after receipt of the Contractor's request:

.1 Proceed with the inspection; or

.2 Advise the Contractor that prerequisites are not adequately fulfilled.

1.8 TOTAL PERFORMANCE OF THE WORK

.1 Following the inspection, the Owner will:

.1 Accept the Certificate of Total Performance of the Work, stating the effective date of Total Performance; or

.2 Reject the Certificate of Total Performance and advise the Contractor of Contract Deficiencies that must be corrected prior to issuance of a Certificate of Total Performance of the Work.

1.9 PREREQUISITES TO WARRANTY PERFORMANCE

.1 The prerequisites to Warranty Performance are:

.1 Total Performance of the Work;

.2 Expiry of the warranty period; and

.3 Correction of items arising from the warranty period required by the Contract Documents.

1.10 INSPECTION FOR WARRANTY PERFORMANCE

.1 Thirty to sixty days prior to the end of the warranty period, the Contractor shall apply to the Owner for acceptance of the Warranty Performance of the Work.

.2 Just prior to the end of the warranty period, the Owner will conduct an inspection for Warranty Performance.

1.11 WARRANTY PERFORMANCE OF THE WORK

.1 Following the inspection, the Owner will:

.1 Issue a Certificate of Warranty Performance of the Work; or

.2 Advise the Contractor of items that must be corrected prior to issuance of the Certificate of Warranty Performance of the Work.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 DESIGNATION OF CONTRACT RECORD DOCUMENTS

.1 At the commencement of the Work, the Owner will provide the following documents to be designated and retained as Contract Record Documents:

.1 One copy of the Specifications.

.2 Two complete sets of the Drawings.

.3 One set of all addenda issued.

.2 Maintain one record copy of the following:

.1 Change Orders and other modifications to the Contract.

.2 Reviewed Shop Drawings, Product Data, and Samples.

.3 Field–test records.

.4 Inspection certificates.

.5 Manufacturers' certificates.

.6 Final survey data.

.7 Environmental Construction Operations Plan

1.2 MAINTENANCE OF CONTRACT RECORD DOCUMENTS

.1 Store Contract Record Documents in the Contractor's Site office apart from documents used for construction. Provide files, racks, and secure storage.

.2 Label each document "CONTRACT RECORD" in large, neatly printed letters.

.3 Maintain Contract Record Documents in a clean, dry, and legible condition. Do not use these documents for construction purposes.

.4 Keep Contract Record Documents available for inspection by the Owner. Revise the content of the documents as required prior to final submittal.

.5 Maintain Contract Record Documents as work progresses. Record information for each area of work within 14 days after completion.

1.3 RECORDING INFORMATION ON CONTRACT RECORD DOCUMENTS

.1 Record information on the Contract Record Documents provided by the Owner.

.2 Use coloured erasable pencils to record information.

.3 Use a different colour to record information pertaining to each major system.

.4 Record changes and variations from the Drawings concurrently with construction progress. Do not cover any work until the required information is recorded.

.5 Legibly mark Contract Record Drawings to record actual construction, including the following:

.1 Measured depths, elevations, and horizontal co-ordinates of instrumentation installed in foundations and structures.

.2 Field changes of dimensions and details.

.3 Changes to equipment layout and services.

.4 Details not on the original Drawings.

.5 References to related Shop Drawings and modifications.

.6 Legibly mark the Specifications to record actual construction including the following:

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

.2 Changes made by addenda and Change Orders.

.7 Maintain other documents including manufacturer's certifications, inspection certifications, field test records required by individual Specification sections.

1.4 SUBMITTALS

.1 Provide the following submittals.

.2 Prepare Contract Record Drawings at least monthly throughout the course of the Work as the information becomes available or the information is received. The Owner's representative will check the Contract Record Drawings and confirm the accuracy of the information by field notes, surveys, photographs, or other field observation methods and return the Contract Record Drawings to the Contractor after review for ongoing revisions.

.3 Completed Contract Record Documents before or with the request for inspection for Total Performance. The owner reserves the right to withhold monies until record documents are provided.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 OPERATION AND MAINTENANCE DATA SUPPLIED BY THE CONTRACTOR

.1 An O&M manual is not required for this project, however information for equipment shall be provided. Prepare operation and maintenance information (spec sheets and manuals) for each of the following:

.1 PLC Components
.2 Radio Components
.3 Radio Antenna
.4 Control Panel Components
.5 Instrumentation
.6 Networking Components

1.2 SUBMITTALS

.1 Provide the following submittals:

.1 One draft copy of the operation and maintenance information prior to requesting inspection for Substantial Performance.

.2 Three copies and one digital copy of the compiled operation and maintenance information prior to requesting inspection for Total Performance.

.2 The Owner reserves the right to withhold any amount of payment up to a maximum of $1,000 until the Contractor provides satisfactory copies of the O&M information.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 SOURCE OF SUPPLY

.1 Provide spare parts manufactured by original equipment manufacturer.

.2 Provide maintenance materials identical to those installed.

1.2 DELIVERY, STORAGE, AND HANDLING

.1 Deliver required items to the Place of the Work and store in temporary locations determined by Contractor or permanent locations designated by Owner.

.2 Deliver and store items in original factory packaging or other securely packaged form.

.3 Identify, on carton or package, name of item, colour or part number, as applicable. Identify equipment, system, area, room no., etc. for which each item is intended.

.4 Maintain an inventory list of all items delivered. For each item, record description of item, quantity, and location where stored.

.5 Stored items shall remain in Contractor's care, custody, and control until the completion of the Work. Protect stored items against theft or damage.

.6 Handle items as necessary, until stored in permanent locations designated by Owner’s Representative.

1.3 ACCEPTANCE

.1 Prior to requesting Owner's final inspection, do the following:

.1 Review Contract Documents and compare with inventory list to verify that all required items have been delivered.

.2 Verify that items listed on inventory list are in there designated storage locations.

.3 Inspect items to verify that they meet specified requirements and are in serviceable condition.

.4 Arrange for delivery of any missing items.

.5 Arrange for replacement of items not meeting specified requirements or not in serviceable condition.

.6 Provide Owner with copy of inventory list indicating status of all required items.

.2 Review inventory list with Owner’s Representative during final inspection.

2. PRODUCTS – NOT USED

3. EXECUTION – NOT USED

END OF SECTION

1. GENERAL

1.1 SECTION INCLUDES:

.1 Requirements for placing Work in a state of readiness for acceptance by Owner.

.2 Section supplements, but does not supersede, specific requirements of other sections.

1.2 INTENT

The Contractor is responsible for all phases of commissioning. The Owner's representative will supply a commissioning manager that will assist the Contractor to fully commission all aspects of the facility. The Commissioning Manager will coordinate full systems commissioning including scheduling, direction of commissioning activities, and informing the Contractor when the applicable equipment manufacturer's representatives are required on site. The Contractor shall supply qualified personnel to assist the Commissioning Manager through all phases of commissioning. The Contractor shall bear the cost of equipment manufacturers technical representatives on site representation. The Commissioning Manager will be the sole judge of the competence and qualifications required of the equipment manufactures technical representative.

2. SCHEDULE

.1 Contractor to allow sufficient time for total systems commissioning and include in the overall project schedule.

.2 Contractor to submit a Commissioning Schedule in "Draft" form, to the Owner's representative at the commencement of the Project. Commissioning Schedule is to be submitted as a supplement to overall Construction Schedule. The Commissioning Manager will review and comment on the Commissioning Schedule.

3. DEFINITIONS AND PROCEDURES

.1 Prestart-up: consists of the non-operating functions required to bring Work to a state of readiness for placing systems into service. Related testing includes but is not limited to hydrostatic and pressure testing, disinfection and completion of Owner supplied installation checklists, labeling, wiring, loop wiring and megger checks on equipment as described in the contract document.

.1 Fill out equipment installation checkout lists for all process mechanical, building mechanical, instrumentation and controls and electrical equipment. Group listing into logical systems or sub-systems for orderly progression of activities during start-up.

.1 Equipment / Instrumentation installation checklists will be provided by the Commissioning Manager at the Project Start-up Meeting.

.2 To extent practical, remove all scaffolding, debris, planks tools and other construction related material.

.3 Remove all sand, silt, dirt and debris from tanks, channels, chambers, instrumentation and control panels and electrical panels and vacuum clean.

.4 Clean all surfaces of tanks and conduits, including walls, roofs, floors and columns and as specified in individual Sections.

.5 Clean interior of all pipes and fluid-carrying equipment, including pumps and inspect with Engineer present.

.6 Conduct leakage and pressure tests in accordance with individual Sections.

.7 Conduct disinfection procedures in accordance with requirements of individual Sections.

.8 Submit all installation, programming (excluded PLC programming) and maintenance manuals for applicable equipment prior to Start-up as deemed necessary by the Owners Commissioning manager. Ensure that this documentation is included in the O&M information as laid out in section 01790

.9 The Contractor shall submit equipment / instrumentation checklists in a consolidated format to the Commissioning Manager 48 working hours (Monday to Friday) in advanced to Start-up activities. Checklists must be fully complete prior to commencing start-up.

.10 The Contractor shall take photos of each piece of equipment after the pre-startup check lists are complete. The Contractor shall coordinate with the Commissioning Manager in advance to completing the checklists to review the requirements of the photos and any additional photos required. Photos must be taken to clearly show the equipment has been fully installed and is tagged correctly. Photos must be provided to the Commissioning Manager 48 working hours (Monday to Friday) in advanced to Start-up activities. Additional costs and/or delays required to collect or recollect photos shall be borne by Contractor.

.2 Start-up: Includes but is not limited to programming (excludes PLC programming), calibration or balancing of instruments and equipment, filling out Start-up instrument and equipment setup sheets and confirming operation of control systems and protective devices and performance testing prior to placing equipment in service.

.1 The Manufacturers technical representatives, in accordance with the requirements of individual Sections, shall be on site for full duration of Start-up of applicable equipment in a system. Supply at this time all documentation relating to testing of equipment and supplier's certification of satisfactory installation.

.2 The Commissioning Manager shall assist the Contractor in programming and setting up the instrumentation in Section 13312 with exceptions as directed in Section 13312.

.3 The Commissioning Manager shall assist the Contractor in filling out Start-up instrument and equipment setup sheets and confirming operation of control systems and protective devices prior to placing equipment in service. Equipment start-up sheets to be included in the O&M manual.

.3 System Start-up:

.1 Includes but is not limited to placing the system or systems into operation, re-confirming all equipment test results, performing any tests not yet carried out which may be deemed necessary by the Owners Representative to demonstrate satisfactory performance of equipment.

.2 Start-up of systems shall take place in an orderly manner. Coordination of start-up shall take place so that adequate staff is available and that conflicts do not occur due to multiple start-ups at the same time.

.4 Commissioning:

.1 Commissioning includes but is not limited to all the procedures and events included under Prestart-up, Start-up, System Start-up and Operator training of systems.

.2 Commissioning is deemed complete when all systems have been operating continuously without fault and all process, mechanical and electrical equipment is free of vibration, overloading or overheating, is functioning in accordance with specified rates, methods and performance and all documentation has been completed submitted and reviewed to the satisfaction of the Commissioning Manager.

.3 The period for continuous operation for completion of commissioning shall be 80 hours, during which time the system shall operate without fault or failure as described above. Provide competent staff to oversee the operation and arrange for manufactures' service personnel and subcontractors' personnel, if so required, to attend to any problems that arise. Failure of any part of the Works during this period will require restart of the 80 hour period following rectification of the fault or failure.

.4 Provide sufficient qualified manpower for duration of the entire commissioning period. Make necessary adjustments during commissioning to enable the Works to be put into continuous operation.

.5 Operator Training:

.1 Special training of facility staff to take place following successful start-up of all systems, during commissioning period. Coordinate visits of equipment suppliers' supervisors and schedule mutually agreeable times for special training periods.

.6 System:

.1 A “system” is defined as an integral operating entity or loop in a process.

.7 Manufacturers Technical Representative:

.1 The equipment manufacturer's technical representative shall be familiar with the equipment supplied and shall come prepared with both knowledge and equipment to perform and interpret the test, inspections and procedures recommended by the manufacturer for the starting of equipment that has not previously been run.

.2 The equipment manufacturer's technical representative shall, immediately after completion of the inspection, convey to the Engineer in writing, confirmation of the tests and inspections carried out and the result of this examination of the work.

.3 If the inspection reveals defects in the Work correct as soon as possible and repeat the entire inspection procedure. Repeat until the Work passes the inspection.

.4 Document the results of the inspection by the equipment manufacturer's representative.

.5 Ensure the installation meets all manufacturer's requirements for durable and trouble-free operation.

4. SEQUENCE OF EVENTS

.1 Installation and Pre-Operational Checks

.1 Ensure equipment is installed in accordance with the manufacturer's instructions. Allow for sufficient days on-site by equipment supplier's qualified technician to instruct installer and inspect installation.

.2 Receive instruction from manufacturers in the methods and precautions to be followed in the installation of the equipment.

.2 Prestart-up

.1 On completion of construction of a system, test and otherwise check the system as defined in definitions and as directed by commissioning manager and be satisfied that it is ready for pre start-up. Note all deficiencies brought to light by Prestart-up activities and rectify before moving to Start-up activities.

.2 Cleaning, leakage testing and disinfection of all systems is required prior to Start-up activities.

.3 Device Start-up

.1 On completion of Prestart-up, the Commissioning Manager in conjunction with the Contractor shall Start-up and otherwise check the equipment and instrumentation in the system as defined in definitions. Note all deficiencies brought to light by Start-up activities and rectify before proceeding to System Startup and placing into operation.

.2 Correct any deficiencies uncovered during Start-up before proceeding to System Start-up activities. Retesting shall be conducted, when required, as determined by the Commissioning Manager.

.4 System Start-up

.1 On satisfactory completion of Start-up of the devices in a system and after the documentation has been completed, submitted and reviewed and after deficiencies have been rectified to the satisfaction of the Owners commissioning manager the system shall be deemed ready to System Start-up.

.2 Notify the Operations staff in writing 48 hours prior to a System Start-up.

.3 The following constraints during System Start-up will be taken into account:

.1 Cleaning and disinfection of all systems is required prior to System Start-ups.

.2 System Start-ups to be done in an orderly manner following a written procedure authored by the Commissioning Manager so that all the various systems of the Works can be placed into simultaneous continuous operation.

.3 A complete simulated System Start-up on parts of the system may be required to reconfirm the equipment prestart test results, particularly in the case of, but not limited to, chemical or hazardous materials and shall be determined by the Owners Commissioning manager. (E.g. Filling a chemical tank with water to confirm the accuracy and or settings of a level transmitter prior to filling with chemical.)

.4 In the event that further deficiencies arise during System Start-up immediately rectify and if of a sufficiently serious nature stop the Start-up of the system till such time as deficiencies are rectified.

.5 Place the system or systems into operation as defined in Start-up and commissioning.

5. RESPONSIBILITY

.1 Be responsible for overall commissioning and continuous operation as defined in definitions.

.2 Coordinate equipment suppliers' representatives and all sub-trades personnel for start-up and commissioning as directed by Owner’s Commissioning Manager.

.3 Arrange for the services of the equipment manufacturer's technical representative, when equipment installation has been completed as directed by Owner’s Commissioning Manager.

.4 Equipment manufacturer's technical representative to inspect installation to ensure that equipment has been installed in accordance with manufacturer's requirements. Make adjustments in accordance with instructions of equipment manufacturer's technical representative.

.5 Advise Engineer in writing that installation of equipment has been checked, installed correctly and is in working order following satisfactory System Start-up.

.6 Cost of equipment manufacturer's representative shall be borne by Contractor. Do not designate a subtrade as a representative during construction, Prestart-up, start-up, System Start-up and continuous operation. In the event that the Work is phased and the equipment manufacturer's representative is required to additional trips to site the additional costs shall be borne by the Contractor.

.7 Owners Commissioning manager will request that equipment be operated to demonstrate that it will perform as specified. Commissioning manager will note deficiencies. Correct deficiencies immediately. Advise Owners Commissioning manager in writing when deficiencies have been corrected.

.8 If deficiencies are of a sufficiently serious nature as determined by the Commissioning Manager that manufacturers' representatives are required to make additional visits, additional costs shall be borne by Contractor.

.9 If it is necessary to suspend start-up, or commissioning, or continuous operation due to deficiencies in any system, the full cost of interruption, call back and resumption of start-up, or commissioning, or programming, or continuous operation shall be paid by Contractor.

.10 Commission and operate the Works during continuous operating period. Operation personnel may observe and assist during commissioning and continuous operating period.

.11 The lack of availability of equipment manufacturers representatives shall not result in an extension to the contract.

6. SYSTEMS DEMONSTRATION

.1 Special training of District staff shall take place following successful System Start-up of all systems, during the commissioning period. Coordinate visits of equipment suppliers' supervisors with Operations Staff and schedule mutually agreeable times for special training periods.

.2 Demonstrate operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times.

.3 Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed upon times.

.4 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

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

.6 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent.

.7 The individuals providing training on equipment must be a manufacture's certified technician with competent instructional skills and fully familiar with the detailed operation and maintenance of the provided equipment. The Owner will be the sole judge of the competence of the instructor and quality of instruction. The Owner reserves the right to withhold any amount of payment up to a maximum of $15,000 until the Contractor provides training to the satisfaction of the Owner.

.8 Training to cover the following items:

.1 Overview of equipment;

.2 Review of Operations and Maintenance Manual documentation for the equipment;

.3 Instruction and demonstration of operation. Includes start up, shut down, all possible equipment faults and possible rectification.

.4 Instruction and demonstration of maintenance to include daily, weekly, monthly, quarterly and annual preventative maintenance checks/actions as recommended by the manufacturer as well as trouble shooting summarized clearly on trouble shooting sheets for the specific model of each major piece of equipment.

.9 All instructional training, supplemented by training and manual handouts, must be in sufficient detail to cover all Owner responsible operations and maintenance requirements to maintain manufacturers' warranties in tack. Training and documentation must highlight specific requirements that if completed or not completed may or would, void or jeopardize the equipment warranty.

.10 Refer to specific equipment section for additional training requirements.

END OF SECTION

1. GENERAL

1.1 INTENT

.1 The work in this section to include, but not necessarily be limited to the following:

.1 Supply, installation, connection and calibration of all instruments as listed in Section 13312.

.2 Shipment of instrumentation components to the control and instrument panel manufacturer where applicable.

.3 Supply, installation and connections of all cable, conduit and wiring for the control and instrumentation systems.

.4 Supply, installation and connection of control panels.

.5 Installation and connection of Programmable Logic Controller.

.6 Commissioning of all instruments as described in Section 01810.

.7 Installation of all Network and Radio components

1.2 SHOP DRAWINGS

.1 Submit the following items:

.1 Field Instruments listed in section 13312

.2 Programmable Logic Controls and Computers section 13317

.3 Radio Equipment listed in section 13318

.4 Control Panels

.5 Control relays

.6 Rail-mount terminals

.7 Rail-mount fuse holders

.8 Power Supplies

.9 Selector Switches and Push Buttons

.10 Uninterruptable Power Supplies

.2 Shop drawings to indicate (where applicable):

.1 Instrument tag numbers(s)

.2 Available range

.3 Materials of construction

.4 Wetted materials

.5 Accuracy

.6 Rating of enclosure

.7 Other details listed on the Instrument Specification Sheet

.8 Detailed wiring/interconnection diagrams with terminal labels

.9 Complete product part numbers for each piece of equipment

.10 Any additional information requested by Owner or Owners representative

2. PRODUCTS

2.1 SPARE PARTS

.1 Provide the following spare parts loose in each new control panel:

.1 Two bulbs of each type used where bulb is incandescent.

.2 Five fuses of each type and rating used.

.3 Two control relays and bases of each type used.

.4 One rail-mount circuit breakers of each type used.

.5 Two push-button and selector switch contact blocks of each type used.

.6 Five pass through terminals of each type

.7 Two fused terminals of each type

3. EXECUTION

3.1 INSTALLATION

.1 The Contractor to be responsible for the correct installation and assembly of all items of equipment. Manufacturer's instructions to be carefully read and rigidly adhered to in the installation.

.2 Any damage resulting from failure to observe the installation instruction or as a result of proceeding without sufficient knowledge of proper installations techniques will be the Contractor's responsibility.

3.2 INSTRUMENT TAGGING

.1 Provide each instrument with a tag stamped or engraved with the Instrument number.

.2 Tags to be done in accordance with specifications described in section 16075.

.3 The code lettering and number system shall be as shown on the P & I drawings or as directed by the Owners Representative.

.4 Affix tags to instruments with nylon tie-wraps or adhesive. Do not use adhesive on curved surfaces.

.5 All tags on existing equipment are to be removed. New tags are to be attached to all existing equipment, with new lettering and numbering as specified in the drawings.

3.3 COMMISSIONING

.1 Commission all instruments as described in Section 01810.

.2 Retain the services of the equipment Manufacturers Technical Representative as required as described in Section 13312.

.3 Upon completion of construction, all circuits are to be operational and all instruments operating within manufacturer's specifications.

.4 Prior to notifying Owner’s Representatives Commissioning Team to begin commissioning activities, verify all PLC inputs, and outputs, and complete Record Drawings as described in this section.

.5 Electrical controls, circuits and systems shall be tested by trial operation of control equipment after all wiring is completed to see that each interlock and control function operates in accordance with the contract drawings and the description of operation for the equipment. Where field conditions prevent actual equipment functioning during testing, the contractor shall simulate the intended operating condition in the associated control circuits.

.6 The contractor shall locate the cause of any malfunction and make the necessary wiring and / or equipment changes or corrections to obtain the particular systems intended operation as defined by the contract drawings. Such changes shall be included in the test report.

.7 Control Panels shall be operated through all design functions. This shall include remote operation of all equipment and actuation of alarms and indicating devices according to design requirements.

.8 Complete operation tests shall be given to all relays, and control devices to show that the equipment performs all design functions and meets design and procurement specifications.

.9 During start-up, assist Commissioning Team in debugging system operation and correct any deficiencies and omissions which appear.

3.4 RECORD REPORTS

.1 During each of the aforementioned tests, the electrical contractor shall maintain a comprehensive set of test reports defining the specific condition in which the apparatus is left, after it has been given approval for use in its indented service. The completed report shall become the property of the Owner.

.2 A check list type report for each individual item of all electrical equipment listed in Division 13, should be headed with but not limited to the following identification data, defining:

1 Equipment Name
2 Item Tag Number
3 Manufacturer
4 Type of Class
5 Application
6 Plant Location
7 Voltage Rating
8 Date of Test
9 Ambient Conditions
10 Testers Signature

.3 Among the specific requirements of testing to determine the equipment's operation condition relative to that particular apparatus, all items shall be visually inspected and evaluated on the report as to its general condition both exterior and interior.

.4 The forms used for testing and startup shall be similar (contain the same information) to the sample form indicated below. MPE can provide template documents upon Contractors request.

MPE Engineering Ltd.

Instrumentation Equipment Startup

Startup

Parameter Input and Checklist

TAG

Project: _____ **Project Manager:** _____

Job Number: _____ **Resident Engineer:** _____

Date: _____ **Contractor Rep:** _____

MPE Onsite Rep: _____ **Manufacturer Rep.** _____ Print Name

Instrumentation Information:

Tag Number: _____ Transmitter: ☐ Receiver: ☐

Manufacturer: _____ Communication: Digital: ☐

Analog: ☐ HART: ☐

Model Number: _____ 4-20mA: ☐

Serial Number: _____ 4 Wire: ☐ 2 Wire: ☐

Voltage: _____

Analog Input Parameters:

Device Units: _____

Device Span: _____

Signal Value Minimum _____ ⇨ Span Value _____ Actual Test: ☐ Simulated Test: ☐

Signal Value Maximum _____ ⇨ Span Value _____ Actual Test: ☐ Simulated Test: ☐

Comments: _____

_____

Analog Input Meets Specification: Yes: ☐ No: ☐

Analog Output Parameters:

Device Units: _____

Device Span: _____

HMI Alarms (Completed by Programmer)

Alarm	Required	Set Point	Confirmed	Reset	HMI Tag
High High	☐		☐	☐	
High High	☐		☐	☐	
Low	☐		☐	☐	
Low Low	☐		☐	☐	

Span Minimum _____ ⇨ Signal Value _____ Actual Test: ☐ Simulated Test: ☐

Span Maximum _____ ⇨ Signal Value _____ Actual Test: ☐ Simulated Test: ☐

Comments: _____

_____

Analog Output Meets Specification: Yes: ☐ No: ☐

Digital Input Parameters:

Digital Signal 1: Active: ☐ High: ☐ Set Point High: _____ Power to Open: ☐
Passive: ☐ Low: ☐ Set Point Low: _____ Power to Close: ☐
Pulse: ☐ Pulse Width: _____ Power Fail Status Description:
Description: _____ _____
_____ _____

Digital Signal 2: Active: ☐ High: ☐ Set Point High: _____ Power to Open: ☐
Passive: ☐ Low: ☐ Set Point Low: _____ Power to Close: ☐
Pulse ☐ Pulse Width: _____ Power Fail Status Description:
Description: _____ _____
_____ _____

Other Digital Signals: _____
_____

Digital Input Meets Specification: Yes ☐ No ☐

Digital Output Parameters:

HMI Alarms (Completed by Programmer)

Digital Signal 1: Active: ☐ High: ☐ Set Point High: _____ Required: ☐ HMI Status
Passive: ☐ Low: ☐ Set Point Low: _____ Alarm on High: ☐ Required: ☐
Pulse: ☐ Pulse Width _____ Alarm on Low: ☐ On: ☐
Continuous: ☐ Reset: ☐ Off: ☐
Description: _____ HMI Tag _____
_____

HMI Alarms (Completed by Programmer)

Digital Signal 2: Active: ☐ High: ☐ Set Point High: _____ Required: ☐ HMI Status
Passive: ☐ Low: ☐ Set Point Low: _____ Alarm on High: ☐ Required: ☐
Pulse: ☐ Pulse Width: _____ Alarm on Low: ☐ On: ☐
Continuous: ☐ Reset: ☐ Off: ☐
Description: _____ HMI Tag _____
_____

Other Digital Signals: _____
_____

Digital Output Meets Specification: Yes ☐ No ☐

Instrumentation Ready for Service: Yes: ☐ No: ☐

Test Equipment Used: Model: _____

Serial No.: _____

Comments: _____
_____
_____
_____
_____

Attachments: _____
_____

Onsite Rep: _____ _____ _____
Print Name Signature Date

END OF SECTION

1. GENERAL

.1 Not Applicable.

2. PRODUCTS

2.1 WIRE AND CABLE

.1 Wire for 120 VAC control signals to be as specified in Division 16, except that control wiring within cabinets shall be minimum #18 AWG.

.2 All control wires shall be color coded as follows:

Less than 50VDC Positive - Red
Less than 50VDC Negative - Blue
50VDC and greater Positive - Violet, Purple or Pink
50VDC and greater Negative - Yellow

120VAC Hot - Black
120VAC Neutral - White
240VAC Hot - Black
120/240VAC Hot - Black and Red
240VAC Neutral - White
208VAC Hot - Red, Black, Blue
208VAC Neutral - White

Ground – Green
Reserved – Brown
Reserved – Orange
Reserved – Gray

.3 Wire for 24 VDC analog instrument signals to be stranded copper, AWG 18, foil or braided shield, 300V rating.

.4 All control and instrumentation cables not in control cabinets shall be protected via interlocked galvanized steel or RPVC Conduit or aluminum armour with PVC Coating.

3. EXECUTION

3.1 TERMINATION OF CONDUCTORS

.1 Where spare conductors are pulled into an instrument or junction box where spare terminals are not provided, tie back spare conductors.

.2 Where spare conductors are pulled into a control panel, provide spare terminals and terminate all conductors.

.3 The conductor and conduit schedules are intended to show the majority of the power and instrument runs. Supply, Install and connect all cables and conduit for the control instrumentation and power system to provide a complete and functional system.

.4 The raceway, conduit and/or wiring method for making the physical connections to equipment and instrumentation devices shall not compromise the equipment's specified rating, manufacture rating or rating required by the location or environment the equipment is located in. i.e. IP68 equipment enclosure rating shall have IP68 wiring methods. The Contractor is responsible to provide and install the appropriate wiring method to suit the application for equipment.

3.2 CABLE LABELING

.1 Label each cable where it enters a panel or instrument with double zip tied engraved lamacoid labels. See section 16075 for electrical identification.

.2 Write on labels are not acceptable.

.3 All teck control cable is to have an outer jacket colour as follows:

.1 Instrumentation and control cable – Grey
.2 Power cable - Black
.3 Ethernet Network cable (Cat5e or Cat6) - Blue

3.3 CONDUCTOR LABELING

.1 Conductors to be labeled at each end by slip-on plastic tags Wieland type Z5 or Weidmuller type Z or by machine-printed heat-shrink labels.

.2 Write on Labels are not acceptable.

END OF SECTION

1. GENERAL

1.1 INTENT

.1 All field instruments required including:

.1 Pressure to Level Transmitters

1.2 RELATED SECTIONS

.1 Division 11 - Equipment

.2 Division 15 - Mechanical, all sections.

.3 Division 16 - Electrical, all sections.

1.3 UNIFORMITY OF INSTRUMENTS

.1 Instruments of one manufacturer to be used throughout to the extent practical. Variations will be permitted only where the major supplier cannot supply a particular instrument as specified.

.2 Note that where the specifications specify a variety of instrument manufacturers, these are to establish standards of quality.

.3 All instruments must be CSA approved and meet all applicable industry standards and codes.

1.4 DRAWINGS AND DESIGN

.1 The drawings are intended to show the major details of the controls and instrumentation work but it is the Contractor's responsibility to examine the electrical, mechanical, structural and architectural drawings before beginning the work and report to the Owner’s Representative any discrepancies or interferences which may occur.

.2 Control and instrumentation system layouts shown on the drawings are generally diagrammatic and the locations of equipment are approximate. Exact routing of conduits, cables, wiring, tubing and air headers to be governed by the mechanical, structural and architectural conditions which prevail.

.3 The Owner’s Representative reserves the right to change the location of any piece of equipment without extra payment therefore, providing only that the change is requested before installation and that the new location is within 1.5 meters of the original location.

1.5 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings.

.2 Indicate:

.1 Instrument manufacturer's name, type, model, year, and serial number.
.2 The manufacturer's specifications for each instrument.
.3 Outline and arrangement drawings.
.4 Cross-sectional drawings.
.5 Materials of construction.
.6 Available range and accuracy.
.7 All other pertinent product information and data.
.8 Identify equipment tag for each instrument.

1.6 OPERATION & MAINTENANCE DATA

.1 Provide operating & maintenance data for incorporation into the - Operation and Maintenance Manual.

.2 Data to Include:

.1 Manufacturer's name, type, model year, capacity and serial number.
.2 Details on operation, servicing and maintenance.
.3 As-built wiring diagrams.
.4 Available range, accuracy and rating information of instrument.

1.7 TAGGING

.1 Provide each instrument with a tag stamped or engraved with the equipment number.

.2 Tags to be 20mm high, 75mm long, 1.5mm thick Lamacoid with 10 mm high alphanumeric characters, Helvetica font, reverse engraved, with 6mm hole on left hand side of tag for mounting. Characters to be white lettering on **RED** coloured background. Stainless steel tags are not acceptable.

.3 The code lettering and number system shall be as shown on the P & I drawings or as directed by the Engineer.

.4 Tags are to be securely strapped to equipment with sunlight resistant ty-raps. Tags are to be clearly visible from general approach to the equipment. Stick on tags are to be approved by the Owner’s Representative and are only acceptable for surface mounted devices that are not subject to moisture.

.5 Coordinate installation of equipment and instrument tags with other divisions to provide a consistent installation method throughout the project.

1.8 MATERIALS

.1 All materials to be new, free from defects and conforming to applicable reference standards.

.2 All materials, linings and coatings in contact with water to be NSF approved for potable water.

.3 Where any standard referenced has been superseded prior to bidding, the Contractor shall comply with the current standard.

2. PRODUCTS

2.1 GENERAL

.1 Manufacturer and Supplier

.1 All instruments shall be of a manufacturer/supplier with service facilities in British Columbia.

.2 Serial Numbers and Nameplates

.1 Each piece of equipment shall be stamped with a serial number, prior to shop performance testing.

.2 Each piece of equipment shall be provided with a substantial steel or brass nameplate attached to the unit, clearly inscribed with the manufacturer's name, year of manufacture and the principal rating data.

.3 Painting

.1 Paint all equipment where applicable to appropriate sections in Division 9.

.4 Instrument Isolation Valves

.1 Where indicated on P&I drawings, provide instruments with block valves, block and bleed valves, or 3-valve manifolds.

.2 Use 316 stainless steel valves on stainless steel and carbon steel piping, bronze-body valves on copper piping, and PVC ball valves on PVC piping.

.3 Acceptable Material

.1 Century CM2 block valve (316 SS)
.2 Century CM29 block and bleed valve (316SS)
.3 Chemline model OMP (PVC)
.4 Century CM3 (3-valve 316 SS)
.5 Crane 9302 (Bronze)

.5 Instrument Description

.1 All instruments are given a description "Tag #". The Tag # refers to the description relative to the P & I drawings and mechanical drawings for reference.

2.3 PRESSURE INDICATING TRANSMITTERS

.1 General

.1 Pressure indicating transmitters must be suitable for service and application. Use isolation diaphragms where required.

.2 Applicable Equipment: PT 102

.3 Liquid Type:
.1 Potable Water: PT 102

.4 Location:
.1 Fairwinds Reservoir

.5 Mounting:
.1 As shown on Contract Drawings and Standard Details.

.6 Operating Conditions:
.1 Fluid Temperature:
.1 2 to 30 Celsius
.2 Pressure:
.1 12.5 to 250 kPa: PT 102

.7 Factory Set Calibration Range:
.1 12.5 to 250 kPa: PT 102

.8 Specified Equipment: PT 102
.1 Manufacturer: ABB
.2 Type: Series 26000T Pressure Transmitter
.3 Model: 261GS-LKBNS1
.4 Reference Accuracy: +/- 0.1 %
.5 Mounting: Direct
.6 Electrical Connection: ½" NPT
.7 Process Connection: ½" NPT
.8 Wetted Parts: 316L SS
.9 Enclosure:
.1 IP67:
.10 Power: Loop powered 2-wire - 24 vdc unit
.11 Display: None
.12 Output:
.1 4-20 mA
.2 Hart Digital Communication Protocol

.9 Tag #'s: PT 102

3. EXECUTION

3.1 INSTALLATION

.1 The Contractor to be responsible for the correct installation and assemble of all items of equipment. Manufacturer's instructions to be carefully read and rigidly adhered to in the installation.

.2 Any damage resulting from failure to observe the installation instruction or as a result of proceeding without sufficient knowledge of proper installations techniques will be the Contractor's responsibility.

.3 Mounting of Instruments & Accessories

.1 Instruments to be installed in accordance with the drawings. Instruments shall be rigidly supported, level and plumb, and in such a manner as to provide accessibility, protection from damage, isolation from heat, shock and vibration, and freedom from interference with other equipment, piping and electrical work.

.2 Instruments not to be installed until heavy construction work adjacent to the instruments has been completed.

.3 Instruments devices including accessories to be located where they will be accessible from structural platforms, permanent ladders, or grade. Locally mounted indicating instruments to face toward, and within reading distance of a normal operating area.

.4 Sufficient clearance to be allowed for removal of equipment for maintenance and repair.

.5 Field located instruments to be mounted on building columns and walls or pipe stands and/or other means of support as required in accordance with manufacturer's instructions and the Drawings.

3.2 INSPECTION

.1 The Contractor will include in his Bid for inspection and startup services by a qualified factory trained manufacturer’s representative to inspect and certify the completed installation of the field instrument.

.2 The Contractor will, after obtaining confirmation for the Engineer, arrange for the equipment supplier’s inspection and will provide sufficient personnel and materials to assist the manufacturer in the inspection and testing of each system completely.

.3 The Contractor will obtain from the manufacturer written certification of the complete installation and testing and will forward to the Engineer.

.4 The Contractor will, at their own expense, repair any irregularities or discrepancies determined during the examination. Any additional trips required by the manufacturer’s representative for re-testing due to faulty installation of incomplete systems shall be borne by the Contractor.

3.3 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

.1 The equipment manufacturer's technical representative shall be familiar with the equipment supplied and shall come prepared with both knowledge and equipment to perform and interpret the test, inspections and procedures recommended by the manufacturer for the starting of equipment that has not previously been run.

.2 The equipment manufacturer's technical representative shall, immediately after completion of the inspection, convey to the Engineer in writing, confirmation of the tests and inspections carried out and the result of this examination of the work.

.3 If the inspection reveals defects in the work, correct as soon as possible and repeat the entire inspection procedure. Repeat until the work passes the inspection.

.4 Document the results of the inspection by the equipment manufacturer's representative.

.5 Ensure the installation meets all manufacturer's requirements for durable and trouble-free operation.

3.4 FIELD INSPECTION

.1 The Engineer will request that the equipment be operated to demonstrate that it will perform as specified. The Engineer will note deficiencies, and if possible, the deficiency will be corrected immediately by the Contractor. All deficiencies that cannot be corrected at the time of inspection will be noted by the Engineer who will advise the Contractor of these deficiencies in writing. Correct the deficiencies as soon as possible and advise the Engineer of their correction. Should the deficiencies be of a sufficiently serious nature to require the work to be re-inspected, the cost of the inspection will be borne by the Contractor.

3.5 TRAINING

.1 The Contractor will include in their price costs a minimum of one hour of training for the Owners operating personnel for field instruments listed in this section by qualified manufacturer personnel. The training shall cover all aspects of operation, maintenance and calibration of the equipment.

3.6 TESTING, ADJUSTING AND COMMISSIONING

.1 Testing, adjusting and commissioning of all instruments shall be in accordance with Section 01810.

END OF SECTION

1. GENERAL

.1 Provide only CSA approved materials and meet all applicable industry standards and codes.

.2 Control panels shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking should be located so as to be clearly visible to qualified persons before examination, adjustment, servicing or maintenance of the equipment. All components used interior to the control panel to be "touch safe" to person or persons opening the control panel while energized.

.3 All Control Panel Wiring to be "Touch Safe" as per IP20 Standards. This rating assures that a probe approximately the size of a finger is not able to make contact with any hazardous or energized parts.

.4 Clearly indicate on the door of the control panel if there can be more than one voltage source.

.5 All control panels to be constructed and certified as per the most recent edition of CSA C22.2 No.286

2. PRODUCTS

2.1 CONTROL PANEL CONSTRUCTION

.1 Provide only CSA approved materials and meet all applicable industry standards and codes.

.2 Contractor to design, supply and construct each control and marshalling panel based upon provided IO lists, field measurements, available record drawings and PLC programs.

.3 Specified equipment:

- .1 Arbutus Pump Station – Communications Panel
- .2 Beachcomber PRV – Control Panel
- .3 Dolphin Reservoir – Control Panel
- .4 Dolphin Reservoir – Communications Panel
- .5 Stewart Road Pump Station – Communications Panel
- .6 Fairwinds Reservoir – Control Panel
- .7 Tippett Road Well 1 – Control Panel
- .8 Fairwinds Well 2 – Control Panel
- .9 Fairwinds Well 3 – Control Panel
- .10 Library Flow Control & PRV – Control Panel
- .11 Madrona Well 8 – Control Panel
- .12 Sherbrooke PRV – Control Panel
- .13 Wall Brook Well 1 – Control Panel

.4 Control Panel Features:

.1 Finish: Gray polyester powder paint inside and out.
.2 Construction: Code Gauge Steel
.3 Rating: NEMA/EEMAC Type 12
.4 Oil resistant gasket
.5 3-point latch mechanism with oil tight keylock handle
.6 Heavy-gauge continuous hinge for door.
.7 Back mounting pan

2.2 TERMINALS

.1 Unfused terminals to be CSA approved for 600 V, 10A, accepting #12- #18 wire. Terminals to be one of:

.1 Wieland WK4/U
.2 Weidmuller SAK4TS
.3 Phoenix Contact UT 4

.2 Fused terminals to be CSA approved for 300 V, 10A, with blown-fuse indicator operating on 120 VAC, accepting #10 - #14 wires, and either 5x20 mm fuses or 1/4" x 1.4" fuses, or both. Terminals to be one of:

.1 Weidmuller ASK-1
.2 Wieland WK4/THSI6GL250U
.3 Phoenix Contact P-FU 6,3x32 LA 250 with UT 6-TG

.3 Provide and install in control panel 10% spare terminals of each type used. Provide 10% spare fuses of each type and size loose in each control panel (Minimum 5 of each type).

.4 Grounding terminals to be CSA approved for 300V, 15A, accepting #14 wires, grounding to the rail, colored green & yellow. Terminals to be one of:

.1 Weidmuller SAK2.5
.2 Wieland WK4SL
.3 Phoenix Contact UT 4-PE

.5 Shorting bars to be used for jumpering. Wire jumpers are not acceptable.

.6 Terminals to be colored as shown:
Less than 50VDC Positive - Red
Less than 50VDC Negative - Blue
50VDC and greater Positive - Violet, Purple or Pink
50VDC and greater Negative - Yellow

120VAC Hot - Black
120VAC Neutral - White
240VAC Hot - Black
120/240VAC Hot - Black and Red
240VAC Neutral - White
208VAC Hot - Red, Black, Blue
208VAC Neutral - White

Ground – Green
Reserved – Brown
Reserved – Orange
Reserved – Gray

.7 All terminals to be din rail mounted.

2.3 LABELING

.1 Each terminal to be labeled with snap on plastic tags, Wieland type 9705, Weidmuller type FW or FS, Phoenix Contact UC-TM or, machine-printed.

.2 All panel-mounted devices to be labelled by means of engraved lamacoid labels, white lettering on black.

.3 Write on labels are not acceptable.

.4 All terminals labels to match terminal numbers as shown in the contract drawings

.5 Each individual conductor or cable assembly entering the control panel from the field is be labeled with machine printed heat shrink labels identifying the field device name, field device terminal number (or signal type) as well as the control panel terminal designation.

Example:
Field device: PIT 1632, terminals: 1(+ signal) 2 (-signal)
Control panel terminals (MCP-1): Rack 1, Slot 3 term 8(+), Rack 1 Slot 3 term 9 (-)

The labeling of the conductors in the control panel should be as follows:
+Signal = PIT 1632 +SIG / R1S3-8
-Signal = PIT 1632 –SIG / R1S3-9

2.4 CONTROL RELAYS

.1 Control relays to be installed in socket with the following features:

.1 Built-in LED, neon or mechanical flag operation indicator
.2 Push-to-operate button (aka push-to-test)
.3 Relays shall have varistor protection for AC coil, and diode protection for DC coil.
.4 Minimum 2 Form C (N.O. and N.C.) Contacts. Contacts to switch minimum 5A 120/240V AC inductive or resistive.

.5 Coil voltage as required, CSA approved.

.3 Operating times to be 20 mS max for AC coil, 30 mS max for DC coil.

.4 Life expectancy to be 100 000 operations @ 5A 120/240V AC.

.5 Relays to be:

.1 Omron: MKS 2PIN Series
.2 Phoenix Contact: PR2 Series, RIF Series
.3 Weidmuller: D Series, Rider Series
.4 Releco: MRC Series, QRC Series, IRC Series
.5 Allen Bradley/Rockwell Automation

.6 Provide and install a minimum of 10% spare relays of each type used in each control panel.

.7 Relays specified to be used as control relays only. Use approved contactor or motor starter to control equipment where loads are greater than 5amp resistive or 2.5amp inductive.

.8 All relays to be labeled with type written labels. Handwritten labels are not acceptable.

2.5 TIME-DELAY RELAYS

.1 Time-delay relays to be installed in socket, with manually-adjustable timing via knob with dial, adjustable timing modes, output status light, operating voltage as required, CSA approved.

.2 Contacts to switch 5A 120/240V AC inductive or resistive.

.3 Life expectancy to be 100 000 operations @ 2A 120/240V AC.

.4 All relays to be OMRON type H3CR-AP, voltage input type. Alternates only considered if pinout and timing functions match approved products.

2.6 PILOT LIGHTS

.1 Water and dust-proof with internal Gasket, jewelled lens, color as shown on drawings, LED bulb, voltage 24-120VAC/VDC.

.2 Lights to be one of following:

.1 Allen-Bradley 800T
.2 Siemens class 52
.3 Eaton 10250T

2.7 PUSH BUTTONS

.1 Water and dust-proof with internal Gasket, flush head, contacts rated 5A 20/240 VAC, accepting AWG 18-12 wires, removable contact blocs.

.2 Push buttons to be one of following:

.1 Allen-Bradley 800T
.2 Siemens class 52
.3 Eaton 10250T

2.8 SELECTOR SWITCHES

.1 Manual selector switches to be Water and dust-proof with internal Gasket, standard black lever actuator, maintained position unless indicated, contacts rated 5A 120/240 VAC, accepting AWG 18-12 wires, removable contact blocks.

.2 Selector switches to be one of following:

.1 Allen-Bradley 800T
.2 Siemens class 52
.3 Eaton 10250T

2.9 WIRE DUCTS

.1 Use Panduit or equivalent plastic type.

.2 Wiring not installed in wire ducts are to be neatly bundled and secured with wrap around spiral banding, secured with cable ties and mounting bases.

2.10 24VDC DC POWER SUPPLIES

.1 Power supply with 24 VDC 10A output for PLC I/O to include over-voltage shutdown, 120V AC input, and CSA approval.

.2 Output voltage to be adjustable ±10% via screwdriver.

.3 Power supplies to be one of the following:

.1 Allen Bradley.
.2 Omron
.3 Phoenix Contact Quint Series
.4 Weidmuller

2.11 UNINTERRUPTIBLE POWER SUPPLIES (UPS)

.1 General Features: 1500VA tower mounted version.

.1 UPS to be of the "dual online conversion" type, with 120V AC input and 120V AC sine-wave output, light to indicate output active, light to indicate whether unit is operating from battery or 120VAC input, and output switch.
.2 UPS to be CSA approved.
.3 Install UPS in configuration as shown in the drawings
.4 Provide and install manufacturer recommend breaker in local electrical panel.
.5 Alternate manufacturers will be acceptable providing they meet or exceed the specifications and functionality of the basis of design products.

.2 Tower Models
.1 Eaton 9SX1500 (1500VA model)
.1 Location: Fairwinds Reservoirs
.2 Required Accessories:
.1 Network Interface Card – NETWORK-M2
.1 Gigabit Web/SNMP card part number

.3 General Features: 500VA Mini Tower version.
.1 UPS to be of the "Standby" type, with 120V AC input and 120V AC sine-wave output, light to indicate power on, light to indicate whether unit is operating from battery or 120VAC input.
.2 UPS to be CSA approved.
.3 Install UPS in configuration as shown in the drawings
.4 Provide and install manufacturer recommend breaker in local electrical panel.
.5 Alternate manufacturers will be acceptable providing they meet or exceed the specifications and functionality of the basis of design products.

.4 Mini Tower Models
.1 APC BE550G-CN (500VA model)
.1 Location: Arbutus Pump Station, Beachcomber PRV, Dolphin Reservoir, Tippet Road Well 1, Fairwinds Well 2, Fairwinds Well 3, Library PRV, Madrona Well 8, Sherbrooke PRV, Wall Brook Well 1

.5 Network Card Model 1
.1 Eaton Network-MS
.1 Install in existing Eaton 9130 UPS
.2 Connect to controls switch as per drawing E1.1
.3 Location: Nanoose Bay WTP Station

.6 Network Card Model 2
.1 Eaton Network-M2
.1 Install in existing Eaton UPS
.2 Connect to controls switch as per drawing E1.1
.3 Location: Nanoose Bay Peninsula Pump, Stewart Road Pump Station

.7 Network Card Model 3
.1 Liebert IS-Unity-SNMP
.1 Install in Liebert UPS
.2 Location: Nanoose Bay Penisula Pump Station

2.15 LIGHTNING PROTECTION UNITS (LPU)

.1 To be installed in control panels for all analog signal instrument cabling (4-20mA, 0-10VDC) that runs to equipment outside of the building
.2 Overvoltage protection terminals for I/O and 4-20mA data signals
.3 Discharge Surge Current Capacity: 10 kA
.4 Din Rail terminal bases with plug in modules
.5 Voltage: As indicated on the drawings
.6 Model: Phoenix Contact PT series or similar.
.7 Spares: Provide 2 spare LPU's per type

2.16 4-20mA LOOP SIGNAL SPLITTER (4 WIRE EXTERNALLY POWERED)

.1 Accepts a 4-20 mA input signal and drives two (2) independent 4-20 mA outputs proportional to input.
.2 Product: Weidmuller: ACT20M-CI-2CO-S
.3 Signals:
.1 Input signal: One (1) 4-20mA, active or passive.
.2 Output Signal: Two (2) 4-20mA, passive.
.4 Power Supply: Provide 24VDC power for signal splitter.
.5 Mounting: Din rail.
.6 Location: Raw Water Control Building.
.7 Acceptable Manufacturers:
.1 Phoenix Contact
.2 Weidmuller
.8 Spares: Provide 1 Spare Signal Splitter

3. EXECUTION

3.1 PANEL INSPECTION

.1 Owners representative is to be given the opportunity inspect control panel construction at the control panel assembly shop prior to panel being relocated to the Construction site.
.2 Panel assembler to provide photos of panel construction progress to Owners representative during construction progress for review.
.3 Contractor is to give Owners representative minimum 5 business day notice prior to relocating Control Panel from the panel assembly shop to the Construction site.
.4 Contractor is to assist Owners representative with function testing control panel in the panel shop. These tasks may include but not be limited to:
.1 Voltage measurements
.2 Current measurements (4-20mA VDC, Up to 20Amp AC/DC)
.3 Continuity measurements
.4 Install temporary jumper wires

.5 Push to test of all relays
.6 Simulation of Relay Logic Circuits

.5 Depending on the progress of Construction as well as the completeness of the PLC program the testing noted in Item 3.1.3 may or **MAY NOT** include testing with the PLC.

3.1 MODIFICATIONS TO EXISTING PANELS

.1 Any wiring changes required in existing control panels shall be coordinated with the Owner and the Owners representative prior to completing.

.2 Work shall not occur on energized or functional or operating controls panels without Owners consent.

.3 Where work is required on energized or operating panels work is to be coordinated and completed that the Owners representative can witness commissioning immediately upon completion should the modification affect operating equipment.

.4 All changes to be tested and commissioned by Contractor and any other necessary parties as defined in specification 01810 Start-Up and Commissioning.

END OF SECTION

1. GENERAL

.1 Should any equipment or software indicated below be no longer available it is the Contractors responsibility to provide equal or better equipment or Software. The Contractor is to confirm with Owners Representative for any part number alterations and order equipment **AFTER** signed reviewed shop drawings have been issued.

2. PRODUCTS

2.1 PROGRAMMABLE LOGIC CONTROLLERS

.1 Allen Bradley 5069 CompactLogix

.1 Location: Arbutus Pump Station, PLC components to be retrofitted into existing control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input	5069-IB16	1
5	16 point 24VDC Discrete Output	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	4

.2 Allen Bradley 5069 CompactLogix

.1 Location: Beachcomber PRV, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input Module	5069-IB16	1
5	16 point 24VDC Discrete Output Module	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	3

.3 Allen Bradley 5069 CompactLogix

.1 Location: Dolphin Reservoir, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input Module	5069-IB16	1
5	16 point 24VDC Discrete Output Module	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	3

.4 Allen Bradley 5069 CompactLogix

.1 Location: Stewart Road Pump Station, PLC components to be retrofitted into existing control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

.5 Allen Bradley 5069 CompactLogix

.1 Location: Fairwinds Reservoirs, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input Module	5069-IB16	1
5	16 point 24VDC Discrete Output Module	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	3

.6 Allen Bradley 5069 CompactLogix

.1 Location: Tippet Road Well 1, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

.7 Allen Bradley 5069 CompactLogix

.1 Location: Fairwinds Well 2, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

.8 Allen Bradley 5069 CompactLogix

.1 Location: Fairwinds Well 3, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	Reserve Module	5069-ARM	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	3

.9 Allen Bradley 5069 CompactLogix

.1 Location: Madrona Pump Station, PLC components to replace PLC in existing control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input Module	5069-IB16	1
5	16 point 24VDC Discrete Output Module	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	3

.10 Allen Bradley 5069 CompactLogix

.1 Location: Mardona Well 8, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

.11 Allen Bradley 5069 CompactLogix

.1 Location: Sherbrooke PRV, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	16 point 24VDC Discrete Input Module	5069-IB16	1
5	16 point 24VDC Discrete Output Module	5069-OB16	1
6	Terminal Blocks	5069-RTB18-SCREW	3

.12 Allen Bradley 5069 CompactLogix

.1 Location: Wall Brook Well 1, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

.13 Allen Bradley 1769 CompactLogix

.1 Location: West Bay Well 4 and Pump Station, PLC components to be installed into new control panel.

Item	Description	Allen-Bradley Part NO.	Qty.
1	EtherNet Adapter	1769-AENTR	1
2	8 Channel Analog Input Module	1769-IF8	1
3	4 Channel Analog Output Module	1769-OF4CI	1
4	16 point 24VDC Discrete Input Module	1769-IQ16	1
5	16 point 24VDC Discrete Output Module	1769-OB16	1
6	Right End-Cap	1769-ECR	1
7	120 VAC Power Supply	1769-PA4	1

.14 Spares: Provide the following spare parts:

Item	Description	Allen-Bradley Part NO.	Qty.
1	CompactLogix 5380 Controller, 600KB	5069-L306ER	1
2	Terminal Blocks	5069-RTB64-SCREW	1
3	8 Channel Analog Input Module	5069-IF8	1
4	4 Channel Analog Output Module	5069-OF4	1
5	16 point 24VDC Discrete Input Module	5069-IB16	1
6	16 point 24VDC Discrete Output Module	5069-OB16	1
7	Terminal Blocks	5069-RTB18-SCREW	4

2.2 ETHERNET DATA SWITCHES

.1 Location

.1 West Bay Well 4 and Pump Station, Nanoose WTP

.2 4 Port Standard Ethernet Switch

.1 Manufacturer: Allen Bradley
.2 Model: 1783-US4T1F
.3 Ports: 4-RJ45, 1 Fiber LC
.4 Data Rate: 10Base-T or 100Base-TX
.5 Input Voltage: 18-30VAC or 12-48VDC
.6 Input Frequency: 47-63 Hz
.7 Flow Control: half-duplex/full duplex
.8 Status Indication: Power Connection/Activity
.9 Storage Temperature: -40ºC - 85ºC
.10 Operating Temperature: -40ºC - 75ºC
.11 Rating: IP 30
.12 Plug-in Connector: Copper RJ45, shielded
.13 Mounting: Horizontal or Vertical on DIN TS 35 rail
.14 Accessories: Patch cable from SFP module to Fiber patch panel

2.3 SERIAL TO ETHERNET CONVERTER

.1 Location:
  .1 Stewart Road Pump Station

.2 Specified Equipment

  .1 Manufacturer: Digi International
  .2 Model: Digi One IAP
  .3 Ports: 1-RS 232 / RS 422 / RS485 (switch selectable), 1-10/100 Base TX Ethernet
  .4 Displays: Power, Link Status
  .5 Power Supply: 9-30Vdc
  .6 Operating and Storage Temperature: +10ºC - +45ºC
  .7 Ratings: CAN/CSA C22.2 No. 60950

3. EXECUTION

3.1 INSTALLATION

.1 Contractor is responsible for installation, wiring, testing, and assisting the Owner representative in commissioning of all PLC equipment, PLC communication equipment, PC equipment and Operator interfaces.

.2 The Contractor shall supply and deliver to the Owner's Representative any of the computer and PLC products identified herein for the purpose of programming. The Owner's Representative will advise the contractor when and which items will be required on a later date. The Contractor will pay all costs associated with handling, extended warranties, etc.

.3 Contractor shall supply all required cabling to connect hardware above.

END OF SECTION

1. GENERAL

1.2 COMMUNICATIONS SUB-CONTRACTORS

.1 The work as specified in this Section to be performed by a qualified Radio Communication sub-contractor.

2. TELEMETRY RADIO AND ANTENNA

2.1 RADIO EQUIPMENT

.1 IO Radio:
- .1 Wireless Modem
  - .1 Manufacturer: Bentek Systems
  - .2 Model: SCADALINK-RIO900
  - .3 Frequency: 900MHz
  - .4 Power Supply: +10 - 30VDC
  - .5 Ports: Inputs – DB9 RS232 Outputs – RS232 / RS485
  - .6 Output Power: 100mW – 1W
  - .7 Mounting: DIN Rail
  - .8 Antenna connector: MCX
  - .9 Surge Suppressor: Polyphasor 900MHz (located within control panel)
  - .10 Location:
    - .1 West Bay Well 4 and Pump Station
    - .2 Library PRV
  - .11 IO Modules
    - .1 Location: West Bay Well 4 and Pump Station

Item	Description	Bentek Part NO.	Qty.
1	4 Channel Analog Output Module	SCADALINK-RAD-MOD-AO4	1
2	8 Channel Discrete Output Module	SCADALINK-RAD-MOD-DO8	1

    - .2 Location: Library PRV

Item	Description	Bentek Part NO.	Qty.
1	4 Channel Analog Input Module	SCADALINK-RAD-MOD-AI4	1
2	8 Channel Discrete Input Module	SCADALINK-RAD-MOD-DI8	1

2.2 ANTENNA CABLING

.1 LMR 400:
- .1 Cable: LMR-400
- .2 Connectors: TC-400-NM
- .3 Grounding Kit: GK-S400TT
- .4 Location:
  - .1) West Bay Well 4 and Pump Station
  - .2) Library PRV

2.3 ANTENNA SELECTION

.1 6dBd Yagi Antenna:
- .1 Gain: 6dBd, 5 element
- .2 Connector: N
- .3 Frequency: 902-928 MHz
- .3 Location:
  - .1) West Bay Well 4 and Pump Station
  - .2) Library PRV

3. EXECUTION

3.1 INSTALLATION

.1 Contractor is responsible for installation, wiring, testing, and assisting the Owner representative in commissioning of all Radio SCADA communication equipment.

.2 The Contractor shall supply and deliver to the Owner's Representative any of the processor or radio products identified herein for the purpose of programming. The Owner's Representative will advise the Contractor when and which items will be required on a later date. The Contractor will pay all costs associated with handling, extended warranties, etc.

.3 Polyphasor surge suppressors are to be installed in the control panels. One polyphasor is required for each LMR 400 cable.

.4 Coaxial cable grounding kits shall be installed prior to cable entering building.

END OF SECTION

1. GENERAL REQUIREMENTS

.1 This specification is to be considered applicable for all electrical drawings and specification related to these contract documents.

2. REGULATORY REQUIREMENTS

.1 Comply with Safety Codes Act and rules and regulations made pursuant thereto, including the Canadian Electrical Code.

.2 Unless otherwise indicated, all references to "Canadian Electrical Code" or "CEC" shall mean the edition of the Canadian Electrical Code, Part I, CSA C22.1, and the variations made thereto by British Columbia regulation, which are in force on the date of bid closing for the Contract.

.3 All electrical products shall be tested, certified and labeled in accordance with a certification program accredited by the Standards Council of Canada (at a minimum, STANDATA Section 2 – Electrical System Equipment). Where a product is not so labeled, provide written approval by the authority having jurisdiction.

.4 Submit to authority having jurisdiction and Utility Company, necessary number of drawings and specifications for examination and approval prior to commencement of electrical work. Pay associated fees.

.5 Submit to Owner, copy of electrical permit obtained from authority having jurisdiction.

.6 If authority having jurisdiction conducts an electrical inspection, submit copy of certificate of acceptance provided by authority having jurisdiction.

.7 All equipment supplied to have 75°C termination ratings.

.8 All cable ampacities in the drawings and specifications are based on equipment termination ratings of 75°C. Should equipment be provided with a different rating it is the Contractors responsibility to size cable accordingly to meet the electrical code requirements.

3. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 Submit shop drawings, product data and samples of equipment and materials. Shop drawings to include but not be limited to the following:

.1 Complete product part numbers for each piece of equipment
.2 Corresponding equipment tag numbers with part numbers
.3 Product specification sheets indicating product features and options
.4 Dimensions in metric measurement (mm or meters)
.5 Weights in metric measurement
.6 Wiring/interconnection diagrams with manufacturer terminals numbers

.7 Any additional information requested by Owner or Owners representative

4. OPERATION AND MAINTENANCE DATA

.1 Provide the following for all systems and components:

.1 Manufacturer's product data, including performance curves, schematics, and wiring diagrams for all electrical control systems.

.2 Manufacturer's installation instructions.

.3 Manufacturer's operation instructions.

.4 Manufacturer's maintenance instructions, including complete parts list for all serviceable components.

.2 Provide a comprehensive list of subcontractors and suppliers who supplied and installed systems and components.

.3 Provide copies of all inspection certification reports from authorities having jurisdiction.

.4 Refer to section 01790 Operation and Maintenance Manuals for additional information.

5. RECORD DRAWINGS

.1 Record actual locations of all pull boxes, panelboards, luminaires, feeders, electrical equipment and electrical site services.

.2 Record any changes to circuit designations.

.3 Include on record drawings, revisions due to engineering change orders, site alterations, additions and field ordered changes made during construction.

.4 Record any changes to control circuit wiring including but not limited to terminal numbering, wire and cable labels, interconnect wiring between equipment.

.5 Record any changes to schedules including panel, luminaire, mechanical, and conduit/cable schedules.

6. COORDINATION

.1 Coordinate work specified in Division 16 with work specified in other Divisions. Ensure that proper arrangements and provisions are made for work specified in Division 16.

7. SOURCE OF SUPPLY

.1 All like materials shall be by a single manufacturer.

8. REFERENCE STANDARDS

.1 Comply with standards of following organizations:

.1 Electrical and Electronic Manufacturers Association of Canada (EEMAC).

.2 National Electrical Manufacturers Association. (NEMA).

.3 Institute of Electrical and Electronic Engineers (IEEE).

.4 Insulated Power Cable Engineers Association (IPCEA).

9. PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Section 01621 for requirements pertaining to product options and substitutions.

10. TESTING

.1 Prior to energizing any portion of the electrical system, perform megger tests on all parts of the distribution system. Results shall meet the requirements of the CEC, authority having jurisdiction and the Contract Documents.

.2 Test results shall be consolidated into a typed report and included in the Operation and Maintenance Manuals.

11. COMMISSIONING

.1 Commission all instruments as described in Section 01810 - Startup and Commissioning.

.2 Retain the services of the equipment Manufacturers Technical Representative as required in each specification section.

.3 Upon completion of construction, all circuits are to be operational and all instruments operating within manufacturer's specifications.

.4 Prior to notifying Owner’s Representatives Commissioning Team to begin commissioning activities, verify all control logic, inputs, and outputs, and complete Record Drawings as described in this section.

.5 Electrical controls, circuits and systems shall be tested by trial operation of control equipment after all wiring is completed to see that each interlock and control function operates in accordance with the contract drawings and the description of operation for the equipment. Where field conditions prevent actual equipment functioning during testing, the contractor shall simulate the intended operating condition in the associated control circuits.

.6 The contractor shall locate the cause of any malfunction and make the necessary wiring and / or equipment changes or corrections to obtain the particular systems intended operation as defined by the contract drawings. Such changes shall be included in the test report.

.7 Control Panels shall be operated through all design functions. This shall include remote operation of all equipment and actuation of alarms and indicating devices according to design requirements.

.8 Complete operation tests shall be given to all relays, and control devices to show that the equipment performs all design functions and meets design and procurement specifications.

.9 During start-up, assist Commissioning Team in debugging system operation and correct any deficiencies and omissions which appear.

12. AMBIENT ENVIRONMENT

.1 Unless otherwise indicated, supply equipment enclosures, boxes, electrical materials and products suitable for ambient environment of the following areas:

	Area	General Classification	Equipment Enclosure Type	Cable / Raceway
1.	Kiosk	Dry, Clean	NEMA 12	Note 1
2.	Pump Room	Dry, Clean	NEMA 12	Note 1
3.	Outdoor Areas	Wet	NEMA 3R	Note 1
4.	Electrical Room	Dry, Clean	NEMA 12	Note 1

Note 1 Install conduit type as per drawings.

13. SPECIAL REQUIREMENTS

.1 Delivery, Storage and Handling (Products, Waste Management, Disposal, etc.): Equipment delivered to site to be protected from all-weather elements. Should equipment be exposed to physical or environmental conditions that the equipment is not rated for, it is the contractor’s responsibility to ensure the conditions are identified to the manufacturer and remedial action is undertaken according to manufacturer instructions. Contractor to ensure equipment is site tested to confirm equipment still meets all manufacturer and relevant standard requirements.

14. SYSTEM ADJUSTMENT

.1 Touch-up paint to repair any damaged surfaces using manufacturer-furnished paint. Leave remaining touch-up paint with owner.

END OF SECTION

1. GENERAL

1.1 REQUIREMENTS

.1 The Electrical Contractor shall be responsible for the disconnection, removal, relocation, reconnection, etc., of electrical devices, equipment, material, etc., as indicated on the drawings and/or as required by renovations to existing building and the installation of new facilities.

.2 All electrical devices and equipment which are disconnected, removed from service, etc., and which are not reused on the job and not required to be retained by the Owner shall be removed from the site.

2. PRODUCTS

2.1 MANUFACTURERS & COMPONENTS

.1 Manufacturers of existing devices and equipment, where known, are indicated on the drawings or in the specifications.

.2 Material and equipment added in renovation area shall match existing, wherever possible, unless otherwise noted.

3. EXECUTION

3.1 GENERAL

.1 Visit site prior to submitting Tender and make survey of renovation areas. Check out locations and operation of all systems and be aware of all requirements involved in changes and modifications to systems. Consult maintenance staff for any information regarding type and operation of systems. Take into account and allow for all work required to existing facilities to meet requirements as indicated on the drawings and in the specifications.

.2 Check and be aware of work requirements of the project. This includes reading of the architectural specifications and verifying and coordinating with General Contractor to ensure that all requirements are covered and allowed for and that all necessary existing facilities are maintained and operational during construction period.

3.2 DEMOLITION

.1 Provide all labour and equipment required to remove existing electrical facilities in the area to be renovated. All miscellaneous conduit, boxes, wiring, etc., no longer required shall be removed.

.2 The work in general shall include, but is not necessarily limited to, the following:

.1 Removal of existing telemetry equipment and re-configuring field wiring and I/O to new PLC's.

.2 Re-locating electrical and non-electrical equipment to accommodate room for new control panels.

.3 Re-configuring existing terminals and control panel wiring to accommodate new PLC and field wiring.

.4 Modification to the existing controls system.

Refer to 00800 Supplementary Conditions for details on demolition and modification restrictions of the existing WTP Building, and maintaining the existing water supply.

3.3 PHASING OF WORK

.1 Disconnection, relocation, reconnection, etc. of existing facilities will be required to accommodate phasing of the work and the installation of new facilities. Be aware of all requirements and make all allowances to accommodate these requirements.

3.4 INSTALLATION

.1 Provide all labour and materials required to revise existing electrical facilities as indicated on the drawings and/or as required by building renovations and for installation of new facilities.

.2 Existing facilities shall remain operational as much as possible during construction period. When renovations are complete, all facilities shall be checked and tested and shall be left in a proper working order and to the satisfaction of Architect, Engineer and Owner.

.3 Where walls, ceilings, floors, etc. containing electrical devices, material and equipment, etc., are removed and the deletion of outlets in said areas disrupts service to adjacent devices and equipment, then conduit and wiring shall be provided to pick up adjacent devices and equipment to maintain continuity of service.

END OF SECTION

1. GENERAL

Not Applicable.

2. PRODUCTS

2.1 CONDUIT

.1 Provide conduit of types and sizes indicated. Refer to Conduit Schedule at end of Section. Where sizes are not indicated, select proper sizes to suit intended use, fulfill wiring requirements, and comply with CEC.

.2 EMT: to CSA C22.2 No.83-M1985. Provide rain-tight fittings in weatherproof and damp areas.

.3 Rigid Metal: to CSA C22.2 No.45-M1981.

.4 Rigid PVC (Unplasticized): to CSA C22.2 No.211.2-M1984.

.5 Flexible Metal Conduit: to CSA C22.2 No. 56-1977.

2.2 WIRE AND CABLE

.1 Building Wiring: to CSA C22.2 No. 75-M1983, copper conductor, 600 V RW90 X-link insulation. Use in all locations, except for underground wire which shall be RW90 X-Link -40°C or TWU75 -40°C.

.2 Wire Sizing: according to CEC except where otherwise indicated. Minimum wire size shall be #12 AWG.

.3 Do not use metallic or non-metallic sheathed cables or wire with aluminum conductors, except where otherwise indicated.

.4 Armoured Cable: to CSA C22.2 No. 51-95. Use only for final connections to luminaires in lengths not exceeding 1.5 m [and for runs concealed in metal or wood frame partitions containing only one circuit].

.5 Aerial and Overhead Cable: Cable assemblies with integral strength member (steel or other) suitable rated for the cable weight and span will be accepted, alternately, the use of outdoor rated cable attached to “aircraft” cable spanning the overhead poles will be acceptable.

2.3 BOXES AND FITTINGS

.1 Provide boxes and fittings suitable for intended use and area installed and as follows:

.1 Outlet Boxes: to CSA C22.2 No. 18-92. Sheet steel, galvanized for concealed boxes and cast metal for surface and weatherproof boxes.

.2 Pull and Junction Boxes: to CSA C22.2 No. 40-M1989. Sheet steel with screw-on covers and barriers as required.

.3 Bushings, Knockout Closures, and Locknuts: to CSA C22.2 No. 18-92.

2.4 WIRING DEVICES

.1 Specification grade and as follows:

.1 Switches: to CSA C22.2 No. 111-M1986, toggle type, 15 A, 125 V, full load rated, ivory colour.

.2 Receptacles: to CSA C22.2 No. 42-M1984, duplex, 15 A, 125 V, U-ground, ivory colour.

.3 Cover Plates: Stainless steel in finished areas, stamped sheet steel in unfinished areas, and cast or polycarbonate, gasketed, in wet areas.

2.5 DISCONNECTS

.1 Disconnects: to CAN/CSA C22.2 No.4-M89, heavy duty, lockable, non-fused, with poles, voltage, amperage, kW ratings and enclosures as indicated on drawings and required by CEC to suit application.

2.6 CABINETS AND ENCLOSURES

.1 Cabinets and Enclosures: to CSA C22.2 No. 40-M1989, and as follows:

.1 Interior Cabinets: EEMAC-1 sheet steel with hinged cover, flush lock and latch.

.2 Backboards: 19 mm good one side (G1S) plywood, as indicated on drawings, primed and pained painted all sides.

.3 Exterior Enclosures: EEMAC-3R insulated sheet steel with hinged doors, hasp and lock, drip lid, mounting posts and electric heater as indicated on drawings.

2.7 SUPPORTING DEVICES

.1 Provide metal brackets, frames, clamps, channels, straps and related devices to adequately support weight of equipment and raceways.

3. EXECUTION

3.1 CONDUIT

.1 Except where otherwise indicated, install all wiring in conduit.

.2 Where practicable, install conduit concealed in walls, floors, ceilings above suspended ceilings and underground.

.3 Install conduit parallel or at right angles to building lines; minimize crossovers and conserve space and headroom.

.4 Install underground conduit minimum 1 m below finished grade.

.5 Mount conduit on underside of metal roof deck by fastening to bottom of metal flutes.

3.2 BOXES

.1 Install boxes flush where practicable and for vertical mounting of devices. Install to nearest course line in masonry walls.

.2 Except where otherwise indicated, mount boxes at following heights to centreline of device:

.1 Switches: 1200 mm.

.2 Receptacles in unfinished areas: 1200 mm.

.3 Receptacles in finished areas: 300 mm.

.4 Telephone: 300 mm.

.5 Manual Breakglass Stations: 1400 mm.

.6 Alarm Bells: 2100 mm.

.7 Clocks: 2100 mm.

.3 Owner may change location of outlets prior to installation, with no change in Contract Price, provided that distance does not exceed 2 m from originally indicated location.

3.3 WIRING DEVICES

.1 Install devices and covers flush and level.

.2 Ensure that outlet boxes are clean prior to installing devices.

3.4 GROUNDING

.1 Provide service ground grid consisting of two ground rods spaced at least 1 m apart and connected by a #6 bare conductor as indicated on drawings.

.2 Provide separate, insulated ground conductor in conduit installed underground, in slabs poured on grade or exposed to moisture and in non-metallic conduit.

.3 Ground all metal parts of building structure and mechanical equipment including piping systems.

3.5 SUPPORTS

.1 Do not fasten supports to piping, ductwork or mechanical equipment.

.2 Aerial / Overhead Cable:
- .1 Affix steel aircraft cable between overhead poles
- .2 Wrap outdoor rated cable assembly around the aircraft cable with minimum one entire wrap per 600mm of aircraft cable
- .3 At each of the the aircraft cable, secure the cable assembly to the aircraft cable within 200mm rubber tape, covered with black electrical tape.

3.6 CONDUIT SCHEDULE

Conduit Type	Locations
Rigid Steel (RS)	Where exposed and subject to mechanical damage on building interior. This includes all conduit runs penetrating above concrete slabs and conduits exiting building walls, electrical service. Exposed conduits outdoors.
Rigid Aluminum (RA)	Area's designated as hazardous.
Rigid PVC (RPVC)	Filter plant areas, areas with liquid piping/filters, underground. Except where otherwise indicated, install all wiring in RPVC conduit.
Flexible metal (FM)	Connections to luminaires, motors and subject to vibration. Allowed only as final connection to device. To be not more than 1.5 meters in length except with permission from Owners representative.
Electric Metal Tubing (EMT)	Recessed in wall, in ceilings, surface mount in electrical rooms and Kiosks (if no other type is indicated in the drawings)
DB2	Concrete encased duct banks
Liquid Tight (LT)	Final connections to equipment. To be not more than 1.5 meters in length except with permission from Owners representative.

END OF SECTION

1. GENERAL

1.1 RELATED SECTIONS

.1	Instrumentation – Control Panels	Section 13313.
.2	Basic Electrical Requirements:	Section 16005.
.3	Voice and Data Cabling Testing:	Section 16712.
.4	Wire and Cable	Section 16121.

1.2 ABBREVIATIONS

.1	ETL	Electronic Testing Laboratories
.2	IDC	Insulation Displacement Connectors
.3	UTP	Unshielded Twisted Pair
.4	NEXT	Near End Crosstalk
.5	ELFEXT	Equal Level Far End Crosstalk
.6	PSNEXT	Power Sum Near End Crosstalk
.7	PSELFEXT	Power Sum Equal Level Far End Crosstalk
.8	DGM	Data-Grade Media
.9	STP	Shielded Twisted Pair
.10	VGM	Voice-Grade Media

1.3 INSTALLER QUALIFICATIONS

.1 Personnel installing communications cabling shall be trained and conversant with communications cabling practices required for this project.

1.4 SCOPE

.1 System to be complete with all data and voice outlets, patch panels, patch cords, wire and cable required to from a complete system.

.2 Install cable in raceway in exposed locations or where concealed in inaccessible walls and ceilings. Elsewhere cable may be installed without raceway.

1.5 STANDARDS

.1 Comply with the following standards:

.1 TIA/EIA 568-B1, B2 and B3
.2 TIA/EIA TSB-67, 72 and 75
.3 ANSI/TIA/EIA 568a-1, 2, 3, 4, 5
.4 TIA/EIA/IS 729
.5 BICSI

2. PRODUCTS

2.1 HORIZONTAL CABLING TO WORKSTATION

.1 UTP: to CAN/CSA T529-M95 and TIA/EIA 568 - B1, B2, B3, Category 5 enhanced.
.2 Fiber Optic Cable: to CSA T529-95.

2.2 COMMUNICATIONS OUTLET ASSEMBLIES

.1 Communications Outlet - Boxes:

.1 1 gang recessed box, 63 mm minimum depth with 19 mm deep two device adapter ring, 1.6 mm 16 AWG thickness.

.2 Communications Outlet - Housings:

.1 Formed Outlet Plate.
.1 Maximum dimensions: 150 mm x 150 mm x 38 mm deep.
.2 Rear and side entry of cable. Strain relief provisions for side entry of cable.
.4 Flat plate: minimum thickness 3.9 mm.
.2 Accepts minimum of two snap-in or slide-in outlet inserts.
.3 Mounts to standard one or two device opening or mounting ring.
.4 Constructed of high-impact fire-retardant thermoplastic.

.3 Communication Outlet - Jacks:

.1 Copper-Based Inserts: to TIA/EIA 568-B1, B2, B3, Category 5 enhanced standards, worst pair:

.1 Termination via fixed or removable IDC, AT&T 110, Krone LSA-Plus, or NT BIX IDC's with hinged or separate stuffer cap.

.2 If removable IDC type is used, they must meet the following physical specifications:
.1 Connection of removable IDC's via 8-position edge connectors plated with minimum 40 microns of nickel. Capable of minimum 250 insertion and withdrawal cycles.
.2 Connection of removable IDC's via 8-pin header connector. Maximum 8.9 N engagement force and minimum 2.25 N disengagement force. Pins minimum 1.4 mm square.

.2 Modular Outlet - UTP:

.1 8-position unkeyed jack for voice and data compatible with 4-pair 100 ohm unshielded twisted pair.
.2 Capable of minimum of 200 insertion and withdrawal cycles.
.3 Copper-based contacts with 50 to 100 microns of nickel overlay uniformly coated with minimum 50 microns of gold overlay.
.4 Minimum contact force 1.1 N per contact. Minimum plug retention force 76 N.
.5 Conductors separated and aligned internally by comb structure.

.6 Electrical Specification:
.1 Contacts:
.1 Dielectric strength: 1000 V rms @ 60 Hz.
.2 Insulation resistance: 10 megohms, minimum.
.3 Contact resistance: 0.02 ohms, maximum.
.4 Current rating: 1.5 amps, maximum.
.2 Insulation Displacement Connectors:
.1 Voltage Rating: 250 VAC.
.2 Current Rating: 5 amps.
.3 Resistance: 0.02 ohms maximum.
.4 Dielectric Withstanding: 2000 VAC for 60 sec.
.5 Insulation Resistance: 500 megohms minimum.

.7 Rated for data transmission up to 100 MHz.
.8 Wire configuration to T568A pair assignment

.3 Fiber-Based Inserts:

.1 Contains two fiber optic outlets.
.2 LC-style connector.
.3 Accept multimode 62.5/125-micron fiber cable.
.4 Dual-fiber cable attached using compatible breakout kit.
.5 Provide dust caps with both outlets.
.6 Transmission Properties:
.1 Insertion loss, maximum: 0.4 dB.
.2 Return loss, minimum: 30 dB.

2.3 FIBER OPTIC CABLE

.1 Physical Description:

.1 Conductors:
.1 Strand: 4
.2 Mode: Multimode
.3 Fiber Type: OM1

.2 Connector Type: LC
.3 Continuous operating temperature: -40°C to +70°C.
.4 Strength member: Aramid.
.5 Minimum bend radius, installation: 130 mm.
Minimum bend radius, long term: 80 mm.
.6 Jacket: outdoor/indoor application

.2 Transmission Characteristics:

.1 Minimum bandwidth: 700 MHz-km @ 850 nm and 500 MHz-km @ 1300 nm.
.2 Maximum attenuation:
.1 3.0 dB/km @ 850 nm.
.2 1.0 dB/km @ 1300 nm.

2.4 PATCH CABLES

.1 UTP Type:

.1 Patch Cables to match installed cable's transmission and electrical specifications.
.2 Fire Rating: plenum rated overall jacket, CSA FT-4 compliant.
.3 Modular Connectors:

.1 Matching types and minimum specifications as for outlet components.
.2 Long body type.
.3 Suitable for solid or stranded conductor and wire gauge used.
.4 Tool-stuffed or plier-stuffed with IDC contacts and plier-latched cap.
.5 Factory manufactured

.4 Quantity: Provide one 1 m and one 3 m UTP patch cord for each new cable outlet.

.2 Optical fiber type:

.1 Fiber Core and Cladding: identical to installed cable.
.2 Transmission Properties: match installed cable's transmission and electrical specifications.
.3 Configuration:
.1 Dual fiber, single jacket, with breakout assemblies separate SC connectors each end.
.2 Single fiber dual cable, separate SC connectors each end.

2.5 IDENTIFICATION MATERIALS

.1 Lamicoid Nameplates: 3 mm thick plastic engraving sheet, black face, white core, mechanically attached, sizes as follows:

.1 Size 1: 12 mm high with 5 mm high letters.

.2 Wire Identification Materials: Use one of the following:

.1 Machine-printed heat shrink sleeves.

.3 Device Identification Materials: Machine-printed black lettering on clear adhesive tape, sizes as follows:

2.6 PATCH PANELS

.1 Copper Cable Patch Panels
.1 Terminate all network cable runs patch panel. Patch panel to include the follwoing features

.1 Punch down blocks on back side of panel for cable run installation
.2 RJ45 female jack on front side of panel.
.3 24 cables per panel.
.4 Standard 19" 1RU rack mount

.2 Fibre Optic Cable Patch Panels

.1 Fibre interconnect center wall mounted, low profile, modular design.
.2 Ports: minimum 6.
.3 Connectors: feed through type LC.
.4 Cable management and slack storage designed to accommodate fibre optic cable bend radius.
.5 Lockable doors or covers for cable termination and patch compartments.
.6 Anchor points for strain relief of fiber cable entry.
.7 Grounding provisions.

3. EXECUTION

3.1 INSTALLATION

.1 Cable Installation:

.1 Generally install FT4 rated data cable and voice cable using raceway except where noted otherwise on drawings or as follows.
.2 Install data and voice cable in conduit where:
  .1 concealed in inaccessible walls or ceilings
  .2 exposed to mechanical damage
  .3 cable runs require fire rating (for example in riser shafts)
.3 Support cable runs independently of ceiling suspension system.
.4 Swab raceway system before installing wiring.
.5 Do not exceed manufacturer's maximum pulling force.
.6 Maintain not less than minimum bending radius for fiber and copper conductors.
.7 Install cable along or at right angles to building lines unless impractical to do so. Verify specific cases of deviation in advance.
.8 Maintain open copper-conductor cable at maximum practical distance from fluorescent ballasts and other EMF - or discharge-generating equipment.
.9 Ensure that cable is not flattened, squeezed, or crimped at any point along entire run. No splices or intermediate terminations in cable runs except by special permission in advance, with documentation detailing locations and nature of splices.
.10 Install cables in PVC raceway in telecom room and fan individual cables to applicable patch panels in neat, logical fashion.
.11 Tie wrap cables neatly into logical bundles.
.12 Minimum 3 m of slack cable per run.

.2 Connectors:

.1 Use tooling specific to connector types in use.
.2 Use connectors suitable for nature of conductor in cable, eg. stranded vs solid copper.
.3 Ensure that connectors' strain relief provisions are used. Strip jackets only amount required.
.4 Maintain pair twists within 13 mm of termination.

.5 UTP Connection Configuration in accordance with EIA/TIA 568A-1991 or CAN/CSA-T529-M95.

Pair	Colour	RJ-45 Pins
1	Blue	4
	White/Blue	5
2	White/Orange	3
	Orange	6
3	White/Green	1
	Green	2
4	White/Brown	7
	Brown	8

.3 Outlets, Boxes and Fittings:

.1 Ensure in advance that outlet box/data outlet installation methods yield vertically-mounted data outlets.
.2 Install all outlets flush with finished surfaces unless indicated otherwise on the drawings.

.4 Cabinets, Enclosures, Racks, Backboards:

.1 Install at locations and heights indicated on drawings.
.2 Use green insulated 6 AWG ground conductors for grounding racks. Use grounding bushing, solderless lug, clamp, or cup washer and screw.
.3 Protect ground conductors from mechanical injury.
.4 Install ground conductors such that neither ground conductors nor data cables interfere with one another in regards to future servicing of patch panel rear connections.

.5 Patch Panels

.1 Mount patch panels in order shown on drawings.
.2 Ground as required by system.
.3 Attach horizontal wiring in an ordered fashion according to the numbers as indicated on the drawings.
.4 Mount panels to racks with as many screws as there are mounting holes or slots in panels.
.5 Provide and install necessary strain reliefs and cable support brackets, plus trays for cable loop behind panel and install cables utilizing such devices.

3.4 COMMUNICATIONS CABLE AND EQUIPMENT LABELING

.1 Label communication outlets, panels and ports with size 1 Device Identification Materials.

.2 Label each of cables with other end’s address using Wire Identification Materials.

.3 Label outlets with labels vertically aligned in each row.

.4 Position panel labels in the same position on each panel.

.5 Use the following naming convention as indicated on the drawings when labeling communications cabling components.

3.2 LOOSE CABLE SCHEDULE

.1 Supply the following cables in loose form for the use by the Owner. Category 5e UTP loose cables to be factory assembled and tested.

Quantity	Cable Type	Length	Ends
10	UTP	2000mm	RJ-45 both ends
4	Fibre Optic	3000mm	LC connectors Both ends

END OF SECTION

1. GENERAL

1.1 RELATED SECTIONS

.1 Data and Voice Cabling: Section 16711.

2. PRODUCTS

Not Used

3. EXECUTION

3.1 TESTING

.1 Test all runs upon completion of permanent terminations, using instrumentation acceptable to Owner. Before commencing testing, submit sample test data sheets and information with respect to test instrumentation to be used.

.2 Copper Media:

.1 Test for the following:

.1 Continuity.
.2 Pair placement and polarity.
.3 DC resistance.
.4 Characteristics at Highest contemplated frequency for data and voice cables:
.1 Attenuation.
.2 Mutual Capacitance.
.3 NEXT, PS NEXT, ELFEXT and PS ELFEXT
.5 Run length.

.2 Before recording results, compare readings to predicted values based on cable specification and run length, using connector and patch cord losses as part of predicted value. Retest runs with:

.1 Resistance and capacitance readings more than 10% above or below predicted values.
.2 NEXT, PS NEXT, ELFEXT or PS ELFEXT values 3dB higher than predicted values.
.3 Attenuation values 2dB higher than predicted values.

.3 Reconnect or re-install and retest as necessary to correct excessive variations.

.3 Fibre Optic Media:

.1 Test for the following:

.1 Continuity

.2 Loss, by using a Test Source and Optical Power Meter calibrated to the same wavelengths, and comparing the Reference Cable to the installed Fibre Optic Cable.

.1 Test at 850nm and 1300nm wavelengths

.2 Predict results based on cable specification, run length, connector loss and patch cable loss.

.3 Confirm loss does not exceed 0.1 dB per 100 feet (30 m) for 850 nm or 0.1 dB per 300 feet(100 m) for 1300 nm.

.4 Reconnect or re-install and retest as necessary to correct excessive variations.

3.2 REPORT

.1 Record results in tabular form.

.2 Segregate horizontal runs, inter-room runs, and risers by category or run and by type of cable.

.3 Present horizontals' results in ascending order, following grid numbering.

.4 Report Submission:

.1 Submit three reports printed on 215 mm x 280 mm white paper. Leave copies unbound for insertion into O&M manuals.

.2 Submit report prepared in electronic form using Microsoft Excel or Lotus 1-2-3 on a CD.

END OF SECTION

1. GENERAL

.1 Coordinate all startup and testing with specification 01810 Startup and Commissioning.

2. PRODUCTS

.1 Not applicable.

3. EXECUTION

3.1 BASIC ELECTRICAL START-UP AND TESTING

.1 Energizing Main Electrical System:

.1 Prior to energizing main electrical system:

.1 Verify supply authority voltage and phase rotation.

.2 Testing of Wiring and Wiring Devices:

.1 Test conductors at distribution centres and panelboards for insulation resistance to ground (megger test).
.2 Test service grounding conductors for ground resistance.
.3 Test all wiring devices for correct operation and circuitry.

.3 Ground Resistance Testing:

.1 Measure ground resistance of ground grids with earth test megger to verify compliance with CSA C22.2 No. 0.4-M1982 and Canadian Electrical Code.

.2 Provide recorded data to Owners representative and insert a copy in the Operation and maintenance manual.

.4 Starting Motors:

.1 Prior to starting motors:

.1 Confirm motor nameplate data with motor starter heater overloads, setting of MCP's and sizing of fuses.
.2 Verify rotation.
.3 Ensure disconnects are installed.
.4 Confirm labeling of motors, disconnects and starters.
.5 Confirm operation of connected I/O
.6 Confirm protection relay settings and operation

3.2 MOTOR CONTROL CENTRES

.1 Ensure all starters are properly labeled prior to testing.

3.4 SMOKE AND HEAT DETECTOR TESTING

.1 Provide the following equipment:

.1 Artificial Smoke
.2 Rate of Rise Heat Detector Tester

.2 Do not proceed with the testing unless the following parties are present at all times during the testing procedure:

.1 Electrical Contractor
.2 Owner's testing representative

.3 Perform a smoke/heat test to each device in the facility. Ensure that the device properly responds to the test (alarms) through the PLC system.

.4 Disassemble and reassemble system components as required.

.5 Disconnect and reconnect wiring as required.

.5 Perform required field adjustments.

.6 Repair defective work and replace defective components

.7 Perform all other work on system required by the testing procedure to ensure a complete working fire detection system.

END OF SECTION



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