



ATLANTIC FIRST NATIONS WATER AUTHORITY INC.

Contract Documents and Specifications

Type of Document

Issued for Tender

Project name

**Neqotkuk First Nation
Wastewater Lift Station Renewal Project**

Project Number

F-24-NQ-07

Date

October 16, 2026

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Project Name:	Neqotkuk First Nation - Wastewater Lift Station Renewal Project
Location:	Neqotkuk First Nation – New Brunswick, Canada
Owner:	Atlantic First Nations Water Authority Inc.
Engineer:	CBCL Limited

1.1 TENDER SUBMISSION

- .1 Submit completed Tender Form for above project by e-mail as follows:

TENDER

for

Neqotkuk First Nation - Wastewater Lift Station Renewal Project

TO

Procurement Department
Atlantic First Nations Water Authority Inc
procurement@afnwa.ca

- .2 A complete Tender is comprised of the following:
- .3 The Tender Form in its entirety, with all the pages and spaces for entry of information by Tenderers filled in as instructed.
- .4 Acknowledgement of addenda(s) received by the Tenderer during the tendering period.
- .5 Tender Security

1.2 TENDER CLOSING/OPENING

- .1 Tender period will close on November 5th, 2026 at 2:00 pm local time.
- .2 Tenders will be “opened” privately, and the results will be sent to all bidders.
- .3 The time stamp of the email received by procurement@afnwa.ca will be used to determine if the submission was received in time not the time it was emailed sent by the sender.
- .4 Last minute submissions are not recommended.
- .5 All tenders shall be valid for acceptance for sixty (60) calendar days from the Closing Date.

1.3 ACCURACY OF REFERENCING

- .1 Indexing and cross-referencing are for convenience only.

1.4 CONDITIONS OF TENDERING

- .2 Take full cognizance of content of all Contract Documents in preparation of Tender. Refer to Section 00 41 42 – Tender Form for a complete list of Contract Documents.

1.5 TENDERER TO INVESTIGATE

- .3 Tenderer will be deemed to have familiarized themselves with the existing site and working conditions and all other conditions which may affect the performance of the contract. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.
- .1 A non-mandatory site meeting is scheduled for October 26, 2026 at 9:00am. Meet at garage located at 276B Main Street located behind Trevor Francis Memorial Emergency Services Centre. Questions may be asked and description of the Work may be discussed during this meeting, however no minutes of the meeting will be distributed. Modifications made by way of addenda, to tendering requirements or the Contract Documents, shall be binding.

1.6 CLARIFICATION AND ADDENDA

- .1 Notify the Procurement Department not less than two (2) working days before Tender Closing of omissions, errors or ambiguities found in Contract Documents. If the Engineer considers that correction, explanation or interpretation is necessary; a written addendum will be issued. All addenda will form part of the Contract Documents. Confirm in the tender that all addenda have been received.

1.7 PREPARATION OF TENDER

- .1 Complete Tender Form provided with Project Documents in ink or by typewriter. Tender all items and fill in all blanks. Have corrections initialed by person signing Tender.
- .2 Any provisional item added to the Tender Form has been identified as not being necessary for this project and the decision to proceed with any such item will be contingent on bid price versus available budget. The final decision to proceed with these item(s) will be by the Owner and the Engineer.
- .3 The Owner will not defray any expenses whatsoever incurred by Tenderers in the preparation and submission of their tenders. The Owner reserves the right to waive any formality or technicality in any tender.

1.8 TAXES

- .1 Where the Work takes place on First Nation Land, no HST or taxes will be applied to the Owner's payments. The Selected Contractor will receive a copy of Owners HST exemption letter.

1.9 TENDER SECURITY

- .1 Tender Security shall be in favor of the Owner and shall be in the form of a Certified Cheque, irrevocable Letter of Credit or a Bond. Tender security shall guarantee to the Owner that in the event of the successful Tenderer declining to enter into a formal agreement with the Owner as called for in the Contract Documents, or declining or neglecting to provide the Insurance or Contract Security required by the Contract Documents, then the Owner will be reimbursed the additional cost of accepting another tender or Tender Security amount, whichever is the lesser. Provide Tender Security in the amount of ten percent (10%) of the tendered price with tender in the form of a Bid Bond on CCDC Form 220.

- .1 A scan of a hard copy bond, certified cheque, or irrevocable letter of credit is permitted provided the original is provided in the subsequent hard copy submission within 24 hours of closing. Email procurement the tracking number for courier deliveries.
 - .2 The bonds shall be issued by a company whose guarantee bonds are acceptable to the Government of Canada.
 - .3 Bonds may be submitted in an electronic or digital format provided it meets the following criteria: The version submitted by the Tenderer must be verifiable by the Owner with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company. The version submitted must be viewable, printable, and storable in standard electronic file formats acceptable to the Owner, and in a single file. Allowable formats include pdf. The verification may be conducted by the Owner immediately or at any time during the life of the bond and at the discretion of the Owner with no requirement for passwords or fees.
- .2 The Tender Security of the unsuccessful Tenderers will be returned to them after the Owner enters into a formal agreement with the successful Tenderer or the expiration of validity of their tenders, whichever occurs first.

1.10 CONTRACT SECURITY

- .1 Contract security will be required in the form of a bond. Include in the Tender a Consent of Surety by a firm legally entitled to do work in province where the work is located and whose worth, over and above its present liabilities, is greater than the total amount of the bonds provided. Contract Security shall be submitted within seven (7) days of award of Contract and shall include a Performance Bond and a Labour and Materials Bond, each in the amount of fifty percent (50%) of the Tender Price or a 20% Irrevocable Letter of Credit in the amount of 20% of the Total Amount Payable. The cost of the bonds shall be borne by the Tenderer.
- .2 The bonds shall be issued by a company whose guaranteed bonds are acceptable to the Government of Canada. Use the latest edition of CCDC Form 221 for a Performance Bond, and a Form 222 for a Labour and Material Bond.
- .3 Bonds may be submitted in an electronic or digital format provided it meets the following criteria: The version submitted by the Tenderer must be verifiable by the Owner with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company. The version submitted must be viewable, printable, and storable in standard electronic file formats acceptable to the Owner, and in a single file. Allowable formats include pdf. The verification may be conducted by the Owner immediately or at any time during the life of the bond and at the discretion of the Owner with no requirement for passwords or fees.
- .4 Digital copies should be included with the tender package submission.
- .5 Within seven (7) days of written acceptance of a tender, the Contractor shall provide Contract Security in the amount and form as specified in Section 00 73 00 Supplementary General Conditions, and Insurance as specified in CCDC 2-2020, GC 11.1.
- .6 Indigenous businesses may be permitted to offer alternative forms of contract security, such as:

- .1 Default insurance
- .2 Partial securities (20% Irrevocable Letter of Credit)
- .3 Tender securing declarations - These alternatives must be approved by the Owner and clearly stated in a letter with tender submission indicating alternatives for of securities will be provided.

1.11 INSURANCE

- .1 As outlined in CCDC 41 – CCDC Insurance Requirements
- .2 Digital copies should be included with the tender package submission.

1.12 FORM OF AGREEMENT

- .1 On the written acceptance by the Owner of a tender, that tender becomes the Contract and the Tenderer who has submitted it becomes the Contractor. The Contractor will be required to enter into a formal agreement with the Owner. The written notice of acceptance forms Contract Agreement until the formal “Agreement” is executed.
- .2 The Form of Agreement in CCDC 2 – 2020 Stipulated Price Contract will form the basis of the contract.

1.13 AMENDMENT OR WITHDRAWAL OF TENDER

- .1 Tenders may be amended or withdrawn by e-mail prior to date and time of closing.
- .2 Amendment of individual unit prices is the only acceptable price amendment. Amendments shall not disclose either original or revised total price.
- .3 Head amendment or withdrawal as follows: “(Amendment)/ (Withdrawal) of Tender for “Neqotkuk First Nation - Wastewater Lift Station Renewal Project”. Sign and seal as required for Tender and submit at e-mail given for receipt of Tenders prior to time of Tender Closing.
- .4 The Owner will not be responsible for any failure attributable to the transmission or reception of the email. The time stamp of the email received by procurement@afnwa.ca will be used to determine if the submission was received in time - not the time it was emailed sent by the sender. Last minute submissions are not recommended.

1.14 INFORMAL OR UNBALANCED TENDERS

- .1 Tenders which, in the opinion of the Owner, are informal or unbalanced may be rejected at the owner’s discretion. The Owner reserves the right to waive formality and technicality.

1.15 RIGHT TO ACCEPT OR REJECT ANY TENDER

- .1 The Owner reserves the right, in its sole discretion, to reject any or all tenders, to not necessarily accept the lowest tender, and to waive any irregularity, formality, informality, or technicality where the Owner determines that doing so is in its best interest.
- .2 In evaluating tenders, the Owner may consider price, completeness of the tender submission, compliance with the Contract Documents, the Tenderer's demonstrated capability and experience, proposed schedule, proposed work plan where required, and the capability of the Tenderer's proposed subcontractors.

- .3 In evaluating a Tenderer's qualifications and suitability, the Owner may consider the Tenderer's past performance on current or previous contracts, whether performed for the Owner or for other owners. Such evaluation may include, but is not limited to:
 - a. achievement of contractual schedules and milestones;
 - b. quality of workmanship;
 - c. compliance with contract requirements;
 - d. responsiveness in correcting deficiencies;
 - e. safety performance;
 - f. contract administration practices;
 - g. frequency and causes of change orders;
 - h. claims, disputes, litigation, defaults, or terminations;
 - i. performance of proposed subcontractors; and
 - j. references obtained from owners, consultants, or regulatory agencies.
- .4 The Owner may reject a Tender where, in the Owner's reasonable opinion and based on documented information reasonably available to it, the Tenderer's qualifications, capability, financial capacity, resources, integrity, or past performance demonstrate a material risk that the Tenderer may be unable or unwilling to perform the Work in accordance with the Contract Documents.
- .5 Without limiting the foregoing, the Owner reserves the right to reject a Tender submitted by a Tenderer that within the previous five (5) years:
 - a. has been terminated for default or cause;
 - b. has failed to complete a contract;
 - c. has demonstrated a pattern of significant schedule delays attributable to the Tenderer;
 - d. has repeatedly delivered deficient or non-conforming work;
 - e. has repeatedly failed to remedy deficiencies or warranty issues;
 - f. has been involved in material contractual disputes, claims, or litigation arising from its performance; or
 - g. has otherwise demonstrated unsatisfactory performance supported by documented evidence.
- .6 The Owner's evaluation of a Tenderer's qualifications, capability, suitability, and past performance shall be final.
- .7 Award of the Contract is conditional upon receipt of all required regulatory approvals, permits, and funding approvals.

1.16 SAFETY CERTIFICATION

- .1 Construction site safety is the responsibility of the Contractor. The Contractor shall name and appoint a site safety supervisor to coordinate and ensure appropriate construction and WHMIS safety procedures are observed and followed on the construction site. All work will

be conducted in strict compliance with the applicable OH&S Act and Regulations at the place or work.

- .2 Submit with Tender, a copy of the Tenderer's current and valid Certificate of Recognition (COR) and Letter of Good Standing issued by the New Brunswick Construction Safety Association.
- .3 Out of province companies shall submit, with their Tender, a current and valid Letter of Good Standing from their province of origin, or from a recognized Safety Association which utilizes and external audit element.
- .4 At least seven (7) days before commencing construction, the Selected Contractor shall submit to the Owner or Engineer a site-specific hazard assessment, copies of applicable safe work practices, confirmation of utility locates, and its corporate health and safety policy, all prepared in accordance with the New Brunswick Occupational Health and Safety Act and regulations.

1.17 CLEARANCE LETTER FROM WORKERS COMPENSATION BOARD

- .1 Submit with the Tender a current and valid WorkSafeNB clearance certificate confirming that the Tenderer's account is in good standing.
- .2 The successful Tenderer shall maintain its WorkSafeNB account in good standing and provide updated clearance certificates upon request and before release of progress or final payments.

1.18 OWNER-SUPPLIED EQUIPMENT

- .1 Owner-supplied equipment, if any, is identified in Section 33 32 13 – Packaged Wastewater Pumping Stations. The Contractor shall coordinate delivery, unloading, storage, protection, installation, testing, commissioning, warranties, and interface requirements for such equipment as specified in the Contract Documents. Shop drawings are available upon request by contacting AFNWA Procurement at procurement@afnwa.ca.

1.19 UNITS OF MEASUREMENT

- .1 This is a metric unit project. Metric units of measure take precedence over imperial units. Where conflicts may arise, notify the Engineer for clarification. No Claims for compensation due to conflicting units will be considered.

1.20 PROJECT FUNDING

- .1 Bidders are advised that the project is subject to funding approvals by Indigenous Services Canada (ISC) and the AFNWA Board.

1.21 EVALUATION OF TENDERS

- .1 The following Bid Value Reductions (BVR) may be applied subject to a maximum of 10% per tender:
 - .1 If Indigenous owned (>50% beneficial ownership), up to 5% Bid Value Reduction.
 - .2 If non-Indigenous owned, historical evidence of commitment to source from or employ Indigenous businesses or people, up to 5% Bid Value Reduction.

- .3 The following Bid Value Reductions (BVRs) may be applied to the Tender Price for evaluation purposes only. The combined BVR for Indigenous ownership and Indigenous labour participation shall not exceed ten percent (10%) of the Tender Price.
- .2 The Bid Value Reduction shall be applied as follows:

Ownership	Percent Reduction	Labour	Percent Reduction
50%	2.5%	0%	0%
60%	3.0%	10%	0.50%
70%	3.5%	20%	1.00%
80%	4.0%	30%	1.50%
90%	4.5%	40%	2.00%
100%	5.0%	50%	2.50%
		60%	3.00%
		70%	3.50%
		80%	4.00%
		90%	4.50%
		100%	5.00%

- .3 The Contractor shall supply additional information on labour hours or dollar value of labour hours contributed by Indigenous people in order for them to avail BVR. The Labour hours shall be verified throughout the project through payroll reports submitted with the invoices.

END OF SECTION

1.1 SALUTATION:

.1 To: Atlantic First Nations Water Authority Inc.
Attention: Chris Fahie, MAsC., P.Eng.
Director of Engineering
90 Treaty Trail, Millbrook, NS B6L 1W2

.2 For: Neqotkuk First Nation
Wastewater Lift Station Renewal Project

.3 From: _____

1.2 TENDER DOCUMENTS

.1 The undersigned Tenderer, having carefully read and examined the undermentioned Contract Documents prepared by CBCL Limited for the completion of the Atlantic First Nations Water Authority, Neqotkuk First Nation, Wastewater Lift Station Renewal Project which comprise all the tender documents in accordance with the following documents:

- .1 Tender Form – Stipulated Price
- .2 CCDC 2- 2020:
 - a. Agreements Between Owner and Contractor
 - b. General Conditions of the Stipulated Price Contract – CCDC 2 -2020
 - c. Supplementary General Conditions
- .3 Specifications
- .4 Drawings
- .5 Addendum/Addenda

hereby accepts the same as part and parcel of the Contract herein referred to, and having carefully examined the locality and site of Work and having full knowledge of the Work required and of the materials to be furnished and used, does hereby Tender and offer to enter into a contract to perform and complete, the whole of the said Work and provide all necessary labour, plant, tools, materials and equipment, as set forth and in strict accordance with the Specifications, Drawings and other Contract Documents and to do all therein called for on the terms and conditions and under the provisions therein set forth as follows.

CONTRACT PRICE \$ _____

1.3 COMPLETION TIME

.1 Tenderer agrees to achieve Substantial Completion within _____ weeks of the Contract Award.

1.4 TENDERER DECLARES:

- .2 That this tender was made without collusion or fraud.
- .3 That the proposed work was carefully examined.
- .4 That the Tenderer was familiar with local conditions.
- .5 That Contract Documents and Addenda No. to inclusive were carefully examined.
- .6 That all the above were taken into consideration in preparation of this Tender.

1.5 TENDERER AGREES:

- .1 To enter into a contract to supply all labour, material and equipment and to do all work necessary to construct the Work as described and specified herein for the stipulated prices subject to additions and deductions according to the terms and conditions of the specifications.
- .2 That the Estimated Contract Price shall be the sum of the products of the tendered unit prices times the estimated quantities in Subsection 4 hereunder.
- .3 That this Tender is valid for acceptance for sixty (60) days from Tender Closing.
- .4 To provide evidence of ability and experience within seven (7) days of request, including: experience in similar work, work currently under contract, senior supervisory staff available for the project, equipment available for use on the Work, and financial resources. The Owner reserves the right to reject any staff proposed for use on this project.
- .5 To execute in triplicate the Agreement and forward same together with the specified contract security and insurance documents to the Owner within fourteen (14) days of written notice of award.
- .6 That failure to enter into a formal Contract and give specified insurance documents and contract security within time required will constitute grounds for forfeiture of certified cheque or enforcement of bid bond.
- .7 A construction schedule shall be prepared to show a continuous and concentrated effort to complete the work. Close adherence to the schedule is a requirement of this Contract and coordination with Owner's Personnel is a requirement of this Contract when establishing the schedule. Start-up shall also be contingent on receiving all pertinent approvals from regulatory authorities.
- .8 Understands the Substantial Performance of the work will be established in accordance with the General Conditions of the Contract.
- .9 Understands the occupational Health and Safety Legislation and any Workers or Workplace compensation legislation applicable to the Place of the Work and declares that they are in good standing and have all necessary certification as required by such legislation.

-
- .10 Agrees that the Warranty Period defined in the Contract Documents shall be for a period of one (1) year from the date of substantial completion of the Work.
 - .11 Understands Contract Security, as specified herein, will be retained until the expiration of the Warranty Period.
 - .12 Understands that Substantial Performance of the Work will be established in accordance with General Conditions of the Contract and applicable lien legislation at the Place of Work.
 - .13 Understands that after the issuance of the certificate of Substantial Performance of the Work by the Consultant, provided that the Contractor has relieved the Owner from any and all claims, and demands for and in respect of the Contract, and has completed all outstanding items and corrected all deficiencies, the Contractor shall submit an application for Final Payment and the Consultant will thereafter prepare the Final Certificate for payment in accordance with the General Conditions of the Contract.
 - .14 Understands that in the event that the tendered Contract Price is not within the project budget, the Owner has the right to negotiate the Contract with the low bidder or reject all tenders received.
 - .15 Understands and agrees that the Owner is not bound to accept the lowest or any tender which they may receive.
 - .16 Agrees to provide, maintain and pay for the insurance coverages specified in the Contract Documents for the duration of the Contract.
 - .17 Declares to have personal knowledge of the location of the proposed Work and is informed as to the actual conditions and requirements, including labour conditions and labour rules and shall not claim at any time after execution of the Agreement that there was any misunderstanding in regard to such conditions and requirements.
 - .18 Workers or Workplace compensation legislation applicable to the Place of the Work and declares that they are in good standing and have all necessary certification as required by such legislation.
 - .19 Agrees that time shall be construed as being of the essence of the Contract.

1.6 SIGNATURES

DATED THIS _____ DAY OF _____, 20__.

[Seal]

Name of Firm Tendering

Signature of Signing Officer

Witness

Name and Title (Printed)

Witness

Signature of Signing Officer

Name and Title (Printed)

Company Address

Telephone No.

Fax No.

*NOTE: Tenders submitted by or on behalf of any Corporation must be signed and sealed in the name of such Corporation by a duly authorized officer or agent.

1.7 SUPPLEMENTARY TENDER INFORMATION:

.1 List of Subcontractors:

List all subcontractors. The provision of the subcontractor list is an undertaking by the contractor to use the listed subcontractor on the project. Obtain the Engineer's approval to add or delete named subcontractors from the above list after the tenders have closed. Award will not be dependent on the sub-contractor list.

END OF SECTION

CCDC 2

Stipulated Price Contract

2 0 2 0

[Name of Project]

Apply a CCDC 2 copyright seal here. The application of the seal demonstrates the intention of the party proposing the use of this document that it be an accurate and unamended form of CCDC 2 – 2020 except to the extent that any alterations, additions or modifications are set forth in supplementary conditions.

CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
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CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE

CCDC 2 STIPULATED PRICE CONTRACT

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CCDC 2 is the product of a consensus-building process aimed at balancing the interests of all parties on the construction project. It reflects recommended industry practices. The CCDC and its constituent member organizations do not accept any responsibility or liability for loss or damage which may be suffered as a result of the use or interpretation of CCDC 2.

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AGREEMENT BETWEEN OWNER AND CONTRACTOR

For use when a stipulated price is the basis of payment.

This Agreement made on _____ day of _____ in the year _____.
by and between the parties

hereinafter called the "Owner"

and

hereinafter called the "Contractor"

The Owner and the Contractor agree as follows:

ARTICLE A-1 THE WORK

The Contractor shall:

1.1 perform the *Work* required by the *Contract Documents* for (insert below the description or title of the Work)

located at (insert below the Place of the Work)

for which the Agreement has been signed by the parties, and for which (insert below the name of the Consultant)

is acting as and is hereinafter called the "Consultant" and

1.2 do and fulfill everything indicated by the *Contract Documents*, and

1.3 commence the *Work* by the _____ day of _____ in the year _____ and, subject to adjustment in *Contract Time* as provided for in the *Contract Documents*, attain *Ready-for-Takeover*, by the _____ day of _____ in the year _____.

ARTICLE A-2 AGREEMENTS AND AMENDMENTS

2.1 The *Contract* supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the *Work*, including the bid documents that are not expressly listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS.

2.2 The *Contract* may be amended only as provided in the *Contract Documents*.

ARTICLE A-3 CONTRACT DOCUMENTS

3.1 The following are the *Contract Documents* referred to in Article A-1 of the Agreement – THE WORK:

- Agreement between *Owner* and *Contractor*
- Definitions
- General Conditions

*

* (Insert here, attaching additional pages if required, a list identifying all other Contract Documents e.g. supplementary conditions; Division 01 of the Specifications – GENERAL REQUIREMENTS; Project information that the Contractor may rely upon; technical Specifications, giving a list of contents with section numbers and titles, number of pages and date; material finishing schedules; Drawings, giving drawing number, title, date, revision date or mark; addenda, giving title, number, date; time schedule)

ARTICLE A-4 CONTRACT PRICE

4.1 The *Contract Price*, which excludes *Value Added Taxes*, is:

/100 dollars \$

4.2 *Value Added Taxes* (of _____ %) payable by the *Owner* to the *Contractor* are:

/100 dollars \$

4.3 Total amount payable by the *Owner* to the *Contractor* for the *Work* is:

/100 dollars \$

4.4 These amounts shall be subject to adjustments as provided in the *Contract Documents*.

4.5 All amounts are in Canadian funds.

ARTICLE A-5 PAYMENT

5.1 Subject to the provisions of the *Contract Documents* and *Payment Legislation*, and in accordance with legislation and statutory regulations respecting holdback percentages, the *Owner* shall:

- .1 make progress payments to the *Contractor* on account of the *Contract Price* when due in the amount certified by the *Consultant* unless otherwise prescribed by *Payment Legislation* together with such *Value Added Taxes* as may be applicable to such payments,
- .2 upon *Substantial Performance of the Work*, pay to the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment, and
- .3 upon the issuance of the final certificate for payment, pay to the *Contractor* the unpaid balance of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.

5.2 Interest

- .1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by adjudication, arbitration or court, interest at the following rates on such unpaid amounts shall also become due and payable until payment:
 - (1) 2% per annum above the prime rate for the first 60 days.
 - (2) 4% per annum above the prime rate after the first 60 days.

Such interest shall be compounded on a monthly basis. The prime rate shall be the rate of interest quoted by
(Insert name of chartered lending institution whose prime rate is to be used)

for prime business loans as it may change from time to time.

- .2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.2.1 of this Article on the settlement amount of any claim in dispute that is resolved either pursuant to Part 8 of the General Conditions – DISPUTE RESOLUTION or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid.

ARTICLE A-6 RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

6.1 *Notices in Writing* will be addressed to the recipient at the address set out below.

6.2 The delivery of a *Notice in Writing* will be by hand, by courier, by prepaid first class mail, or by other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.

6.3 A *Notice in Writing* delivered by one party in accordance with this *Contract* will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it will be deemed to have been received five calendar days after the date on which it was mailed, provided that if either such day is not a *Working Day*, then the *Notice in Writing* will be deemed to have been received on the *Working Day* next following such day.

6.4 A *Notice in Writing* sent by any form of electronic communication will be deemed to have been received on the date of its transmission provided that if such day is not a *Working Day* or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it will be deemed to have been received at the opening of business at the place of receipt on the first *Working Day* next following the transmission thereof.

6.5 An address for a party may be changed by *Notice in Writing* to the other party setting out the new address in accordance with this Article.

Owner

*name of Owner**

address

email address

Contractor

*name of Contractor**

address

email address

Consultant

*name of Consultant**

address

email address

** If it is intended that a specific individual must receive the notice, that individual's name shall be indicated.*

ARTICLE A-7 LANGUAGE OF THE CONTRACT

- 7.1 When the *Contract Documents* are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English / French # language shall prevail.
Complete this statement by striking out inapplicable term.
- 7.2 This Agreement is drawn in English at the request of the parties hereto. La présente convention est rédigée en anglais à la demande des parties.

ARTICLE A-8 SUCCESSION

- 8.1 The *Contract* shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors, and assigns.

In witness whereof the parties hereto have executed this Agreement by the hands of their duly authorized representatives.

SIGNED AND DELIVERED
in the presence of:

WITNESS

OWNER

name of Owner

signature

signature

name of person signing

name and title of person signing

WITNESS

CONTRACTOR

name of Contractor

signature

signature

name of person signing

name and title of person signing

- N.B. Where legal jurisdiction, local practice or Owner or Contractor requirement calls for:*
- (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or*
 - (b) the affixing of a corporate seal, this Agreement should be properly sealed.*

DEFINITIONS

The following Definitions shall apply to all *Contract Documents*.

Change Directive

A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Contractor* to proceed with a change in the *Work* within the general scope of the *Contract Documents* prior to the *Owner* and the *Contractor* agreeing upon adjustments in the *Contract Price* and the *Contract Time*.

Change Order

A *Change Order* is a written amendment to the *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Contractor* stating their agreement upon:

- a change in the *Work*;
- the method of adjustment or the amount of the adjustment in the *Contract Price*, if any; and
- the extent of the adjustment in the *Contract Time*, if any.

Construction Equipment

Construction Equipment means all machinery and equipment, either operated or not operated, that is required for preparing, fabricating, conveying, erecting, or otherwise performing the *Work* but is not incorporated into the *Work*.

Consultant

The *Consultant* is the person or entity engaged by the *Owner* and identified as such in the Agreement. The *Consultant* is the Architect, the Engineer or entity licensed to practise in the province or territory of the *Place of the Work*.

Contract

The *Contract* is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the *Contract Documents* and represents the entire agreement between the parties.

Contract Documents

The *Contract Documents* consist of those documents listed in Article A-3 of the Agreement – CONTRACT DOCUMENTS and amendments agreed upon between the parties.

Contract Price

The *Contract Price* is the amount stipulated in Article A-4 of the Agreement – CONTRACT PRICE.

Contract Time

The *Contract Time* is the time from commencement of the *Work* to the date of *Ready-for-Takeover* as stipulated in paragraph 1.3 of Article A-1 of the Agreement – THE WORK.

Contractor

The *Contractor* is the person or entity identified as such in the Agreement.

Drawings

The *Drawings* are the graphic and pictorial portions of the *Contract Documents*, wherever located and whenever issued, showing the design, location and dimensions of the *Work*, generally including plans, elevations, sections, details, and diagrams.

Notice in Writing

A *Notice in Writing*, where identified in the *Contract Documents*, is a written communication between the parties or between them and the *Consultant* that is transmitted in accordance with the provisions of Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

Owner

The *Owner* is the person or entity identified as such in the Agreement.

Other Contractor

Other Contractor means a contractor, other than the *Contractor* or a *Subcontractor*, engaged by the *Owner* for the *Project*.

Payment Legislation

Payment Legislation means such legislation in effect at the *Place of the Work* which governs payment under construction contracts.

Place of the Work

The *Place of the Work* is the designated site or location of the *Work* identified in the *Contract Documents*.

Product

Product or Products means material, machinery, equipment, and fixtures forming part of the *Work*, but does not include *Construction Equipment*.

Project

The *Project* means the total construction contemplated of which the *Work* may be the whole or a part.

Ready-for-Takeover

Ready-for-Takeover shall have been attained when the conditions set out in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER have been met, as verified by the *Consultant* pursuant to paragraph 12.1.4.2 of GC 12.1 – READY-FOR-TAKEOVER.

Shop Drawings

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, *Product* data, and other data which the *Contractor* provides to illustrate details of portions of the *Work*.

Specifications

The *Specifications* are that portion of the *Contract Documents*, wherever located and whenever issued, consisting of the written requirements and standards for *Products*, systems, workmanship, quality, and the services necessary for the performance of the *Work*.

Subcontractor

A *Subcontractor* is a person or entity having a direct contract with the *Contractor* to perform a part or parts of the *Work* at the *Place of the Work*.

Substantial Performance of the Work

Substantial Performance of the Work is as defined in the lien legislation applicable to the *Place of the Work*.

Supplemental Instruction

A *Supplemental Instruction* is an instruction, not involving adjustment in the *Contract Price* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models, or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents* as required for the performance of the *Work*.

Supplier

A *Supplier* is a person or entity having a direct contract with the *Contractor* to supply *Products*.

Temporary Work

Temporary Work means temporary supports, structures, facilities, services, and other temporary items, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.

Value Added Taxes

Value Added Taxes means such sum as shall be levied upon the *Contract Price* by the Federal or any Provincial or Territorial Government and is computed as a percentage of the *Contract Price* and includes the Goods and Services Tax, the Quebec Sales Tax, the Harmonized Sales Tax, and any similar tax, the collection and payment of which have been imposed on the *Contractor* by tax legislation.

Work

The *Work* means the total construction and related services required by the *Contract Documents*.

Working Day

Working Day means a day other than a Saturday, Sunday, statutory holiday, or statutory vacation day that is observed by the construction industry in the area of the *Place of the Work*.

GENERAL CONDITIONS

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

- 1.1.1 The intent of the *Contract Documents* is to include the labour, *Products* and services necessary for the performance of the *Work* by the *Contractor* in accordance with these documents. It is not intended, however, that the *Contractor* shall supply products or perform work not consistent with, not covered by, or not properly inferable from the *Contract Documents*.
- 1.1.2 The *Contract Documents* are complementary, and what is required by one shall be as binding as if required by all. Performance by the *Contractor* shall be required only to the extent consistent with the *Contract Documents*.
- 1.1.3 The *Contractor* shall review the *Contract Documents* for the purpose of facilitating co-ordination and execution of the *Work* by the *Contractor*.
- 1.1.4 The *Contractor* is not responsible for errors, omissions or inconsistencies in the *Contract Documents*. If there are perceived errors, omissions or inconsistencies discovered by or made known to the *Contractor*, the *Contractor* shall promptly report to the *Consultant* and shall not proceed with the work affected until the *Contractor* has received corrected or additional information from the *Consultant*.
- 1.1.5 If there is a conflict within the *Contract Documents*:
- .1 the order of priority of documents, from highest to lowest, shall be
 - the Agreement between *Owner* and *Contractor*,
 - the Definitions,
 - Supplementary Conditions,
 - the General Conditions,
 - Division 01 of the *Specifications*,
 - technical *Specifications*,
 - material and finishing schedules,
 - the *Drawings*.
 - .2 *Drawings* of larger scale shall govern over those of smaller scale of the same date.
 - .3 dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.
 - .4 amended or later dated documents shall govern over earlier documents of the same type.
 - .5 noted materials and annotations shall govern over graphic indications.
- 1.1.6 Nothing contained in the *Contract Documents* shall create any contractual relationship between:
- .1 the *Owner* and a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
 - .2 the *Consultant* and the *Contractor*, a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
- 1.1.7 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- 1.1.8 References in the *Contract Documents* to the singular shall be considered to include the plural as the context requires.
- 1.1.9 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Contractor* in dividing the work among *Subcontractors* and *Suppliers*.
- 1.1.10 *Specifications*, *Drawings*, models, and copies thereof furnished by the *Consultant* are and shall remain the *Consultant's* property, with the exception of the signed *Contract* sets, which shall belong to each party to the *Contract*. All *Specifications*, *Drawings* and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications*, *Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*.
- 1.1.11 Physical models furnished by the *Contractor* at the *Owner's* expense are the property of the *Owner*.

GC 1.2 LAW OF THE CONTRACT

- 1.2.1 The law of the *Place of the Work* shall govern the interpretation of the *Contract*.

GC 1.3 RIGHTS AND REMEDIES

- 1.3.1 Except as expressly provided in the *Contract Documents*, 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.

- 1.3.2 No action or failure to act by the *Owner*, the *Consultant* or the *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.

GC 1.4 ASSIGNMENT

- 1.4.1 Neither party to the *Contract* shall assign the *Contract* or a portion thereof without the written consent of the other, which consent shall not be unreasonably withheld.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1 AUTHORITY OF THE CONSULTANT

- 2.1.1 The *Consultant* will have authority to act on behalf of the *Owner* only to the extent provided in the *Contract Documents*, unless otherwise modified by written agreement as provided in paragraph 2.1.2.
- 2.1.2 The duties, responsibilities and limitations of authority of the *Consultant* as set forth in the *Contract Documents* shall be modified or extended only with the written consent of the *Owner*, the *Consultant* and the *Contractor*.

GC 2.2 ROLE OF THE CONSULTANT

- 2.2.1 The *Consultant* will provide administration of the *Contract* as described in the *Contract Documents*.
- 2.2.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to become familiar with the progress and quality of the work and to determine if the *Work* is proceeding in general conformity with the *Contract Documents*.
- 2.2.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant's* responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Contractor*.
- 2.2.4 Based on the *Consultant's* observations and evaluation of the *Contractor's* applications for payment, the *Consultant* will determine the amounts owing to the *Contractor* under the *Contract* and will issue certificates for payment as provided in Article A-5 of the Agreement – PAYMENT, GC 5.3 – PAYMENT and GC 5.5 – FINAL PAYMENT.
- 2.2.5 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Contractor's* failure to perform the *Work* in accordance with the *Contract Documents*.
- 2.2.6 Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Contract Documents*.
- 2.2.7 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents* shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.
- 2.2.8 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Contractor*.
- 2.2.9 The *Consultant's* interpretations and findings will be given in writing to the parties within a reasonable time.
- 2.2.10 With respect to claims for a change in *Contract Price*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.
- 2.2.11 The *Consultant* will have authority to reject work which in the *Consultant's* opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or other persons performing any of the *Work*.
- 2.2.12 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Contractor* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Contractor*.
- 2.2.13 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other submittals by the *Contractor*, in accordance with the *Contract Documents*.

- 2.2.14 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 2.2.15 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* and verify that *Ready-for-Takeover* has been attained.
- 2.2.16 All certificates issued by the *Consultant* will be to the best of the *Consultant's* knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.
- 2.2.17 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Contractor* and will forward such warranties and documents to the *Owner* for the *Owner's* acceptance.
- 2.2.18 If the *Consultant's* engagement is terminated, the *Owner* shall immediately engage a *Consultant* against whom the *Contractor* makes no reasonable objection and whose duties and responsibilities under the *Contract Documents* will be that of the former *Consultant*.

GC 2.3 REVIEW AND INSPECTION OF THE WORK

- 2.3.1 The *Owner* and the *Consultant* shall have access to the *Work* at all times. The *Contractor* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.
- 2.3.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, by the *Consultant's* instructions, or by the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* reasonable notification of when the work will be ready for review and inspection. The *Contractor* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.
- 2.3.3 The *Contractor* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.
- 2.3.4 If the *Contractor* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the *Contractor* shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed, and make good covering work at the *Contractor's* expense.
- 2.3.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Contractor* shall correct the work and pay the cost of examination and correction. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.
- 2.3.6 The *Contractor* shall pay the cost of making any test or inspection, including the cost of samples required for such test or inspection, if such test or inspection is designated in the *Contract Documents* to be performed by the *Contractor* or is required by the laws or ordinances applicable to the *Place of the Work*.
- 2.3.7 The *Contractor* shall pay the cost of samples required for any test or inspection to be performed by others if such test or inspection is designated in the *Contract Documents*.

GC 2.4 DEFECTIVE WORK

- 2.4.1 The *Contractor* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work was incorporated in the *Work* or the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Contractor*.
- 2.4.2 The *Contractor* shall make good promptly *Other Contractors' work* destroyed or damaged by such corrections at the *Contractor's* expense.
- 2.4.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Contractor* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Contractor* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a finding.

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

- 3.1.1 The *Contractor* shall have total control of the *Work* and shall effectively direct and supervise the *Work* so as to ensure conformity with the *Contract Documents*.

- 3.1.2 The *Contractor* shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the *Work* under the *Contract*.

GC 3.2 CONSTRUCTION BY THE OWNER OR OTHER CONTRACTORS

- 3.2.1 The *Owner* reserves the right to award separate contracts in connection with other parts of the *Project* to *Other Contractors* and to perform work with own forces.
- 3.2.2 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner*'s own forces, the *Owner* shall:
- .1 provide for the co-ordination of the activities and work of *Other Contractors* and the *Owner*'s own forces with the *Work* of the *Contract*;
 - .2 enter into separate contracts with *Other Contractors* under conditions of contract which are compatible with the conditions of the *Contract*;
 - .3 ensure that insurance coverage is provided to the same requirements as are called for in GC 11.1 – INSURANCE and co-ordinate such insurance with the insurance coverage of the *Contractor* as it affects the *Work*; and
 - .4 take all reasonable precautions to avoid labour disputes or other disputes on the *Project* arising from the work of *Other Contractors* or the *Owner*'s own forces.
- 3.2.3 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner*'s own forces, the *Contractor* shall:
- .1 afford the *Owner* and *Other Contractors* reasonable opportunity to store their products and execute their work;
 - .2 co-ordinate and schedule the *Work* with the work of *Other Contractors* or the *Owner*'s own forces that are identified in the *Contract Documents*;
 - .3 participate with *Other Contractors* and the *Owner* in reviewing their construction schedules when directed to do so; and
 - .4 report promptly to the *Consultant* in writing any apparent deficiencies in the work of *Other Contractors* or of the *Owner*'s own forces, where such work affects the proper execution of any portion of the *Work*, prior to proceeding with that portion of the *Work*.
- 3.2.4 Where a change in the *Work* is required as a result of the co-ordination and integration of the work of *Other Contractors* or *Owner*'s own forces with the *Work*, the changes shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 3.2.5 Disputes and other matters in question between the *Contractor* and *Other Contractors* shall be dealt with as provided in Part 8 of the General Conditions – DISPUTE RESOLUTION provided the *Other Contractors* have reciprocal obligations. The *Contractor* shall be deemed to have consented to arbitration of any dispute with any *Other Contractor* whose contract with the *Owner* contains a similar agreement to arbitrate. In the absence of *Other Contractors* having reciprocal obligations, disputes and other matters in question initiated by the *Contractor* against *Other Contractors* will be considered disputes and other matters in question between the *Contractor* and the *Owner*.
- 3.2.6 Should the *Owner*, the *Consultant*, *Other Contractors*, or anyone employed by them directly or indirectly be responsible for ill-timed work necessitating cutting or remedial work to be performed, the cost of such cutting or remedial work shall be valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

GC 3.3 TEMPORARY WORK

- 3.3.1 The *Contractor* shall have the sole responsibility for the design, erection, operation, maintenance, and removal of *Temporary Work* unless otherwise specified in the *Contract Documents*.
- 3.3.2 The *Contractor* shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in paragraph 3.3.1 where required by law or by the *Contract Documents* and in all cases where such *Temporary Work* is of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- 3.3.3 Notwithstanding the provisions of GC 3.1 – CONTROL OF THE WORK, paragraphs 3.3.1 and 3.3.2 or provisions to the contrary elsewhere in the *Contract Documents* where such *Contract Documents* include designs for *Temporary Work* or specify a method of construction in whole or in part, such designs or methods of construction shall be considered to be part of the design of the *Work* and the *Contractor* shall not be held responsible for that part of the design or the specified method of construction. The *Contractor* shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the *Work*.

GC 3.4 CONSTRUCTION SCHEDULE

3.4.1 The *Contractor* shall:

- .1 prepare and submit to the *Owner* and the *Consultant* prior to the first application for payment, a construction schedule that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time*;
- .2 monitor the progress of the *Work* relative to the construction schedule and update the schedule on a monthly basis or as stipulated by the *Contract Documents*; and
- .3 advise the *Consultant* of any revisions required to the schedule as the result of extensions of the *Contract Time* as provided in Part 6 of the General Conditions – CHANGES IN THE WORK.

GC 3.5 SUPERVISION

3.5.1 The *Contractor* shall provide all necessary supervision and appoint a competent representative who shall be in attendance at the *Place of the Work* while the *Work* is being performed. The appointed representative shall not be changed except for valid reason.

3.5.2 The appointed representative shall represent the *Contractor* at the *Place of the Work*. Information and instructions provided by the *Consultant* to the *Contractor's* appointed representative shall be deemed to have been received by the *Contractor*, except with respect to Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

3.6.1 The *Contractor* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:

- .1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;
- .2 incorporate the applicable terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and
- .3 be as fully responsible to the *Owner* for acts and omissions of *Subcontractors*, *Suppliers* and any persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Contractor*.

3.6.2 The *Contractor* shall indicate in writing, if requested by the *Owner*, those *Subcontractors* or *Suppliers* whose bids have been received by the *Contractor* which the *Contractor* would be prepared to accept for the performance of a portion of the *Work*. Should the *Owner* not object before signing the *Contract*, the *Contractor* shall employ those *Subcontractors* or *Suppliers* so identified by the *Contractor* in writing for the performance of that portion of the *Work* to which their bid applies.

3.6.3 The *Owner* may, for reasonable cause, at any time before the *Owner* has signed the *Contract*, object to the use of a proposed *Subcontractor* or *Supplier* and require the *Contractor* to employ one of the other subcontract bidders.

3.6.4 If the *Owner* requires the *Contractor* to change a proposed *Subcontractor* or *Supplier*, the *Contract Price* and *Contract Time* shall be adjusted by the difference occasioned by such required change.

3.6.5 The *Contractor* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Contractor* may reasonably object.

3.6.6 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor's* or *Supplier's* work which has been certified for payment.

GC 3.7 LABOUR AND PRODUCTS

3.7.1 The *Contractor* shall maintain good order and discipline among the *Contractor's* employees engaged on the *Work* and employ only workers that are skilled in the tasks assigned.

3.7.2 The *Contractor* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*.

3.7.3 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.

GC 3.8 SHOP DRAWINGS

3.8.1 The *Contractor* shall provide *Shop Drawings* as required in the *Contract Documents*.

3.8.2 The *Contractor* shall provide *Shop Drawings* to the *Consultant* to review in accordance with an agreed schedule, or in the absence of an agreed schedule, in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of *Other Contractors* or the *Owner's* own forces.

- 3.8.3 The *Contractor* shall review all *Shop Drawings* before providing them to the *Consultant*. The *Contractor* represents by this review that:
- .1 the *Contractor* has determined and verified all applicable field measurements, field construction conditions, *Product* requirements, catalogue numbers and similar data, or will do so, and
 - .2 the *Contractor* has checked and co-ordinated each *Shop Drawing* with the requirements of the *Work* and of the *Contract Documents*.
- 3.8.4 The *Consultant's* review is for conformity to the design concept and for general arrangement only.
- 3.8.5 At the time of providing *Shop Drawings*, the *Contractor* shall expressly advise the *Consultant* in writing of any deviations in a *Shop Drawing* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance or rejection of such deviation expressly in writing.
- 3.8.6 The *Consultant's* review shall not relieve the *Contractor* of responsibility for errors or omissions in the *Shop Drawings* or for meeting all requirements of the *Contract Documents*.
- 3.8.7 The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or, in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the *Work*.

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

- 4.1.1 The *Contract Price* includes the cash allowances, if any, stated in the *Contract Documents*. The scope of the *Work* or costs included in such cash allowances shall be as described in the *Contract Documents*.
- 4.1.2 The *Contract Price*, and not the cash allowances, includes the *Contractor's* overhead and profit in connection with such cash allowances.
- 4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.
- 4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the *Consultant's* direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for overhead and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the *Contract Documents*.
- 4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor's* overhead and profit on such amount.
- 4.1.6 The value of the *Work* performed under a cash allowance is eligible to be included in progress payments.
- 4.1.7 The *Contractor* and the *Consultant* shall jointly prepare a schedule that shows when the items called for under cash allowances must be ordered to avoid delaying the progress of the *Work*.

GC 4.2 CONTINGENCY ALLOWANCE

- 4.2.1 The *Contract Price* includes the contingency allowance, if any, stated in the *Contract Documents*.
- 4.2.2 The contingency allowance includes the *Contractor's* overhead and profit in connection with such contingency allowance.
- 4.2.3 Expenditures under the contingency allowance shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.
- 4.2.4 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.2.3 and the contingency allowance.

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- 5.1.1 The *Owner* shall, at the request of the *Contractor*, before signing the *Contract*, and promptly from time to time thereafter, furnish to the *Contractor* reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*.
- 5.1.2 The *Owner* shall give the *Contractor Notice in Writing* of any material change in the *Owner's* financial arrangements to fulfil the *Owner's* obligations under the *Contract* during the performance of the *Contract*.

GC 5.2 APPLICATIONS FOR PAYMENT

- 5.2.1 Applications for payment on account as provided in Article A-5 of the Agreement – PAYMENT shall be submitted monthly to the *Owner* and the *Consultant* simultaneously as the *Work* progresses.
- 5.2.2 Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties.
- 5.2.3 The amount claimed shall be for the value, proportionate to the amount of the *Contract*, of *Work* performed and *Products* delivered to the *Place of the Work* as of the last day of the payment period.
- 5.2.4 The *Contractor* shall submit to the *Consultant*, at least 15 calendar days before the first application for payment, a schedule of values for the parts of the *Work*, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of applications for payment.
- 5.2.5 The schedule of values shall be made out in such form as specified in the *Contract* and supported by such evidence as the *Consultant* may reasonably require.
- 5.2.6 Applications for payment shall be based on the schedule of values accepted by the *Consultant* and shall comply with the provisions of *Payment Legislation*.
- 5.2.7 Each application for payment shall include evidence of compliance with workers' compensation legislation at the *Place of the Work* and after the first payment, a declaration by the *Contractor* as to the distribution made of the amounts previously received using document CCDC 9A 'Statutory Declaration'.
- 5.2.8 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.

GC 5.3 PAYMENT

- 5.3.1 After receipt by the *Consultant* and the *Owner* of an application for payment submitted by the *Contractor* in accordance with GC 5.2 – APPLICATIONS FOR PAYMENT:
 - .1 The *Consultant* will issue to the *Owner* and copy to the *Contractor*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* certifies a different amount, or rejects the application or part thereof, the *Owner* shall promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*.
 - .2 The *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT on or before 28 calendar days after the receipt by the *Owner* and the *Consultant* of the application for payment, and in any event, in compliance with *Payment Legislation*.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

- 5.4.1 The *Consultant* will review the *Work* to certify or verify the validity of the application for *Substantial Performance of the Work* and will promptly, and in any event, no later than 20 calendar days after receipt of the *Contractors* application:
 - .1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or
 - .2 state the date of *Substantial Performance of the Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.
- 5.4.2 Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the *Owner* shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*, place the holdback amount in a bank account in the joint names of the *Owner* and the *Contractor*.
- 5.4.3 Subject to the requirements of any *Payment Legislation*, all holdback amount prescribed by the applicable lien legislation for the *Work* shall become due and payable to the *Contractor* no later than 10 *Working Days* following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*.
- 5.4.4 The *Contractor* shall submit an application for payment of the lien holdback amount in accordance with GC 5.3 – PAYMENT.
- 5.4.5 Where legislation permits progressive release of the holdback for a portion of the *Work* and the *Consultant* has certified or verified that the part of the *Work* has been performed prior to *Substantial Performance of the Work*, the *Owner* hereby agrees to release, and shall release, such portion to the *Contractor* in accordance with such legislation.

- 5.4.6 Notwithstanding any progressive release of the holdback, the *Contractor* shall ensure that such parts of the *Work* are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released.

GC 5.5 FINAL PAYMENT

- 5.5.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment.
- 5.5.2 The *Consultant* will, no later than 10 calendar days after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and when the *Consultant* finds the *Contractor's* application for final payment valid, the *Consultant* will promptly issue a final certificate for payment to the *Owner*, with a copy to the *Contractor*.
- 5.5.3 If the *Consultant* rejects the application or part thereof, the *Owner* will promptly issue a written notice to the *Contractor* giving reasons for the revision or rejection, such written notice to be in compliance with *Payment Legislation*.
- 5.5.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 – WORKERS' COMPENSATION, and any legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 calendar days after the issuance of a final certificate for payment, pay the *Contractor* as provided in Article A-5 of the Agreement – PAYMENT and in any event, in compliance with *Payment Legislation*.

GC 5.6 DEFERRED WORK

- 5.6.1 If because of climatic or other conditions reasonably beyond the control of the *Contractor*, or if the *Owner* and the *Contractor* agree that, there are items of work that must be deferred, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such deferred *Work*.

GC 5.7 NON-CONFORMING WORK

- 5.7.1 No payment by the *Owner* under the *Contract* nor partial or entire use or occupancy of the *Work* by the *Owner* shall constitute an acceptance of any portion of the *Work* or *Products* which are not in accordance with the requirements of the *Contract Documents*.

PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

- 6.1.1 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make:
- .1 changes in the *Work* consisting of additions, deletions or other revisions to the *Work* by *Change Order* or *Change Directive*, and
 - .2 changes to the *Contract Time* for the *Work*, or any part thereof, by *Change Order*.
- 6.1.2 The *Contractor* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.

GC 6.2 CHANGE ORDER

- 6.2.1 When a change in the *Work* is proposed or required, the *Consultant* will provide the *Contractor* with a written description of the proposed change in the *Work*. The *Contractor* shall promptly present to the *Consultant*, in a form that can be reasonably evaluated, a method of adjustment or an amount of adjustment for the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change in the *Work*.
- 6.2.2 When the *Owner* and the *Contractor* agree to the adjustments in the *Contract Price* and *Contract Time* or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in the applications for progress payment.

GC 6.3 CHANGE DIRECTIVE

- 6.3.1 If the *Owner* requires the *Contractor* to proceed with a change in the *Work* prior to the *Owner* and the *Contractor* agreeing upon the corresponding adjustment in *Contract Price* and *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.
- 6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.
- 6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.

- 6.3.4 Upon receipt of a *Change Directive*, the *Contractor* shall proceed promptly with the change in the *Work*.
- 6.3.5 For the purpose of valuing *Change Directives*, changes in the *Work* that are not substitutions or otherwise related to each other shall not be grouped together in the same *Change Directive*.
- 6.3.6 The adjustment in the *Contract Price* for a change carried out by way of a *Change Directive* shall be determined on the basis of the cost of the *Contractor's* actual expenditures and savings attributable to the *Change Directive*, valued in accordance with paragraph 6.3.7 and as follows:
- .1 If the change results in a net increase in the *Contractor's* cost, the *Contract Price* shall be increased by the amount of the net increase in the *Contractor's* cost, plus the *Contractor's* percentage fee on such net increase.
 - .2 If the change results in a net decrease in the *Contractor's* cost, the *Contract Price* shall be decreased by the amount of the net decrease in the *Contractor's* cost, without adjustment for the *Contractor's* percentage fee.
 - .3 The *Contractor's* fee shall be as specified in the *Contract Documents* or as otherwise agreed by the parties.
- 6.3.7 The cost of performing the work attributable to the *Change Directive* shall be limited to the actual cost of the following in as much as it contributes directly to the implementation of the *Change Directive*:

Labour

- .1 rates that are listed in the schedule or as agreed by the *Owner* and the *Contractor* including wages, benefits, compensation, contributions, assessments, or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan for:
 - (1) trade labour in the direct employ of the *Contractor*;
 - (2) the *Contractor's* personnel when stationed at the field office;
 - (3) the *Contractor's* personnel engaged at shops or on the road, in expediting the production or transportation of materials or equipment; and
 - (4) the *Contractor's* office personnel engaged in a technical capacity, or other personnel identified in Article A-3 of the Agreement – CONTRACT DOCUMENTS for the time spent in the performance of the *Work*;

Products, Construction Equipment and Temporary Work

- .2 cost of all *Products* including cost of transportation thereof;
- .3 in the absence of agreed rates, cost less salvage value of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under \$1,000 owned by the *Contractor*;
- .4 rental cost of *Construction Equipment*, *Temporary Work* and tools, exclusive of hand tools under \$1,000;
- .5 cost of all equipment and services required for the *Contractor's* field office;

Subcontract

- .6 subcontract amounts of Subcontractor with pricing mechanism approved by the *Owner*;

Others

- .7 travel and subsistence expenses of the *Contractor's* personnel described in paragraph 6.3.7.1;
- .8 deposits lost provided that they are not caused by negligent acts or omissions of the *Contractor*;
- .9 cost of quality assurance such as independent inspection and testing services;
- .10 charges levied by authorities having jurisdiction at the *Place of the Work*;
- .11 royalties, patent license fees, and damages for infringement of patents and cost of defending suits therefor subject always to the *Contractor's* obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 – PATENT FEES;
- .12 premium for all contract securities and insurance for which the *Contractor* is required, by the *Contract Documents*, to provide, maintain and pay in relation to the performance of the *Work*;
- .13 losses and expenses sustained by the *Contractor* for matters which are the subject of insurance under the policies prescribed in GC 11.1 – INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts or within the deductible amounts;
- .14 taxes and duties, other than *Value Added Taxes*, income, capital, or property taxes, relating to the *Work* for which the *Contractor* is liable;
- .15 charges for voice and data communications, courier services, expressage, transmittal and reproduction of documents, and petty cash items;
- .16 cost for removal and disposal of waste products and debris;
- .17 legal costs, incurred by the *Contractor*, in relation to the performance of the *Work* provided that they are not:
 - (1) relating to a dispute between the *Owner* and the *Contractor* unless such costs are part of a settlement or awarded by arbitration or court,
 - (2) the result of the negligent acts or omissions of the *Contractor*, or
 - (3) the result of a breach of this *Contract* by the *Contractor*;
- .18 cost of auditing when requested by the *Owner*; and
- .19 cost of *Project* specific information technology in accordance with the method determined by the parties.

- 6.3.8 Notwithstanding any other provisions contained in the General Conditions of the *Contract*, it is the intention of the parties that the cost of any item under any cost element referred to in paragraph 6.3.7 shall cover and include any and all costs or liabilities attributable to the *Change Directive* other than those which are the result of or occasioned by any failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* attention to the *Work*. Any cost due to failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* performance of the *Work* attributable to the *Change Directive* shall be borne by the *Contractor*.
- 6.3.9 The *Contractor* shall keep full and detailed accounts and records necessary for the documentation of the cost of performing the *Work* attributable to the *Change Directive* and shall provide the *Consultant* with copies thereof.
- 6.3.10 For the purpose of valuing *Change Directives*, the *Owner* shall be afforded reasonable access to all of the *Contractor's* pertinent documents related to the cost of performing the *Work* attributable to the *Change Directive*.
- 6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as the result of a *Change Directive* is eligible to be included in progress payments.
- 6.3.12 If the *Owner* and the *Contractor* do not agree on the proposed adjustment in the *Contract Time* attributable to the change in the *Work*, or the method of determining it, the adjustment shall be referred to the *Consultant* for a finding.
- 6.3.13 When the *Owner* and the *Contractor* reach agreement on the adjustment to the *Contract Price* and to the *Contract Time*, this agreement shall be recorded in a *Change Order*.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- 6.4.1 If the *Owner* or the *Contractor* discover conditions at the *Place of the Work* which are:
- .1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* and differ materially from those indicated in the *Contract Documents*; or
 - .2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,
- then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.
- 6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.
- 6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* will promptly inform the *Owner* and the *Contractor* in writing.
- 6.4.4 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 – ARTIFACTS AND FOSSILS and GC 9.5 – MOULD.

GC 6.5 DELAYS

- 6.5.1 If the *Contractor* is delayed in the performance of the *Work* by the *Owner*, the *Consultant*, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.
- 6.5.2 If the *Contractor* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or any person employed or engaged by the *Contractor* directly or indirectly, resulting in the failure of the *Contractor* to attain *Ready-for-Takeover* by the date stipulated in Article A-1 of the Agreement – THE WORK, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.
- 6.5.3 If the *Contractor* is delayed in the performance of the *Work* by:
- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound),
 - .2 fire, unusual delay by common carriers or unavoidable casualties,
 - .3 abnormally adverse weather conditions, or

- .4 any cause beyond the *Contractor's* control other than one resulting from a default or breach of *Contract* by the *Contractor*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for costs incurred by such delays unless such delays result from actions by the *Owner*, the *Consultant* or anyone employed or engaged by them directly or indirectly.

6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.

6.5.5 If no schedule is made under paragraph 2.2.12 of GC 2.2 – ROLE OF THE CONSULTANT, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

6.6.1 If the *Contractor* intends to make a claim for an increase to the *Contract Price*, or if the *Owner* intends to make a claim against the *Contractor* for a credit to the *Contract Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party and to the *Consultant*.

6.6.2 Upon commencement of the event or series of events giving rise to a claim, the party intending to make the claim shall:

- .1 take all reasonable measures to mitigate any loss or expense which may be incurred as a result of such event or series of events, and
- .2 keep such records as may be necessary to support the claim.

6.6.3 The party making the claim shall submit within a reasonable time to the *Consultant* a detailed account of the amount claimed and the grounds upon which the claim is based and the *Consultant* will make a finding upon such claim.

6.6.4 Where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, at such intervals as the *Consultant* may reasonably require, submit further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.

6.6.5 The *Consultant's* findings, with respect to a claim made by either party, will be given by *Notice in Writing* to both parties within 30 *Working Days* after receipt of the claim by the *Consultant*, or within such other time period as may be agreed by the parties.

6.6.6 If such finding is not acceptable to either party, the claim shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION.

PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

7.1.1 If the *Contractor* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Contractor's* insolvency, or if a receiver is appointed because of the *Contractor's* insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Contractor's* right to continue with the *Work*, by giving the *Contractor* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.

7.1.2 If the *Contractor* neglects to perform the *Work* properly or otherwise fails to comply with the requirements of the *Contract* to a substantial degree and if the *Consultant* has given a written statement to the *Owner* and *Contractor* which provides the detail of such neglect to perform the *Work* properly or such failure to comply with the requirements of the *Contract* to a substantial degree, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Contractor Notice in Writing*, containing particulars of the default including references to applicable provisions of the *Contract*, that the *Contractor* is in default of the *Contractor's* contractual obligations and instruct the *Contractor* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.

7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Contractor* shall be in compliance with the *Owner's* instructions if the *Contractor*:

- .1 commences the correction of the default within the specified time,
- .2 provides the *Owner* with an acceptable schedule for such correction, and
- .3 corrects the default in accordance with the *Contract* terms and with such schedule.

- 7.1.4 If the *Contractor* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may by giving *Notice in Writing*:
- .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Contractor* for the *Work* provided the *Consultant* has certified such cost to the *Owner* and the *Contractor*, or
 - .2 terminate the *Contractor*'s right to continue with the *Work* in whole or in part or terminate the *Contract*.
- 7.1.5 If the *Owner* terminates the *Contractor*'s right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall be entitled to:
- .1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense,
 - .2 withhold further payment to the *Contractor* until a final certificate for payment is issued,
 - .3 charge the *Contractor* the amount by which the full cost of finishing the *Work* as certified by the *Consultant*, including compensation to the *Consultant* for the *Consultant*'s additional services and a reasonable allowance as determined by the *Consultant* to cover the cost of corrections to work performed by the *Contractor* that may be required under GC 12.3 – WARRANTY, exceeds the unpaid balance of the *Contract Price*; however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference, and
 - .4 on expiry of the warranty period, charge the *Contractor* the amount by which the cost of corrections to the *Contractor*'s work under GC 12.3 – WARRANTY exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the *Contractor* the difference.
- 7.1.6 The *Contractor*'s obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Contractor* up to the time of termination shall continue in force after such termination of the *Contract*.

GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

- 7.2.1 If the *Owner* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Owner*'s insolvency, or if a receiver is appointed because of the *Owner*'s insolvency, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.2.2 If the *Work* is suspended or otherwise delayed for a period of 20 *Working Days* or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or of anyone directly or indirectly employed or engaged by the *Contractor*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* *Notice in Writing* to that effect.
- 7.2.3 The *Contractor* may give *Notice in Writing* to the *Owner*, with a copy to the *Consultant*, that the *Owner* is in default of the *Owner*'s contractual obligations if:
- .1 the *Owner* fails to furnish, when so requested by the *Contractor*, reasonable evidence that financial arrangements have been made to fulfill the *Owner*'s obligations under the *Contract*,
 - .2 the *Consultant* fails to issue a certificate as provided in Part 5 of the General Conditions – PAYMENT,
 - .3 the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by adjudication, arbitration or court, or
 - .4 the *Owner* fails to comply with the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER, gives a written statement to the *Owner* and the *Contractor* that provides detail of such failure to comply with the requirements of the *Contract* to a substantial degree.
- 7.2.4 The *Contractor*'s *Notice in Writing* to the *Owner* provided under paragraph 7.2.3 shall advise that if the default is not corrected within 5 *Working Days* following the receipt of the *Notice in Writing*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, suspend the *Work* or terminate the *Contract*.
- 7.2.5 If the *Contractor* terminates the *Contract* by giving a *Notice in Writing* to the *Owner* under the conditions set out above, the *Contractor* shall be entitled to be paid for all work performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*.

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

- 8.1.1 Differences between the parties to the *Contract* as to the interpretation, application or administration of the *Contract* or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved

in the first instance by findings of the *Consultant* as provided in GC 2.2 – ROLE OF THE CONSULTANT, shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION.

- 8.1.2 If a dispute arises under the *Contract* in respect of a matter in which the *Consultant* has no authority under the *Contract* to make a finding, the procedures set out in paragraph 8.1.3 and paragraphs 8.3.3 to 8.3.8 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION, and in GC 8.4 – RETENTION OF RIGHTS apply to that dispute with the necessary changes to detail as may be required.
- 8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instructions as in the *Consultant's* opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*.

GC 8.2 ADJUDICATION

- 8.2.1 Nothing in this *Contract* shall be deemed to affect the rights of the parties to resolve any dispute by adjudication as may be prescribed by applicable legislation.

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

- 8.3.1 In accordance with the rules for mediation as provided in CCDC 40 'Rules for Mediation and Arbitration of Construction Industry Disputes' in effect at the time of bid closing, the parties shall appoint a Project Mediator
- .1 within 20 *Working Days* after the *Contract* was awarded, or
 - .2 if the parties neglected to make an appointment within the 20 *Working Days*, within 10 *Working Days* after either party by *Notice in Writing* requests that the Project Mediator be appointed.
- 8.3.2 A party shall be conclusively deemed to have accepted a finding of the *Consultant* under GC 2.2 – ROLE OF THE CONSULTANT and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*. The responding party shall send a *Notice in Writing* of reply to the dispute within 10 *Working Days* after receipt of such *Notice in Writing* setting out particulars of this response and any relevant provisions of the *Contract Documents*.
- 8.3.3 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, frank, candid, and timely disclosure of relevant facts, information and documents to facilitate these negotiations.
- 8.3.4 After a period of 10 *Working Days* following receipt of a responding party's *Notice in Writing* of reply under paragraph 8.3.2, the parties shall request the Project Mediator to assist the parties to reach agreement on any unresolved dispute. The mediated negotiations shall be conducted in accordance with the rules for mediation as provided in CCDC 40 in effect at the time of bid closing.
- 8.3.5 If the dispute has not been resolved at the mediation or within such further period as is agreed by the parties, the Project Mediator will terminate the mediated negotiations by giving *Notice in Writing* to the *Owner*, the *Contractor* and the *Consultant*.
- 8.3.6 By giving a *Notice in Writing* to the other party and the *Consultant*, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.3.5, either party may refer the dispute to be finally resolved by arbitration under the rules of arbitration as provided in CCDC 40 in effect at the time of bid closing. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.
- 8.3.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.3.6 is not binding on the parties and, if a *Notice in Writing* is not given under paragraph 8.3.6 within the required time, the parties may refer the unresolved dispute to the courts or to any other form of dispute resolution, including arbitration, which they have agreed to use.
- 8.3.8 If neither party, by *Notice in Writing*, given within 10 *Working Days* of the date of *Notice in Writing* requesting arbitration in paragraph 8.3.6, requires that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.3.6 shall be:
- .1 held in abeyance until:
 - (1) *Ready-for-Takeover*,
 - (2) the *Contract* has been terminated, or
 - (3) the *Contractor* has abandoned the *Work*,whichever is earlier; and

.2 consolidated into a single arbitration under the rules governing the arbitration under paragraph 8.3.6.

GC 8.4 RETENTION OF RIGHTS

- 8.4.1 It is agreed that no act by either party shall be construed as a renunciation or waiver of any rights or recourses, provided the party has given the *Notice in Writing* required under Part 8 of the General Conditions – DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3 of GC 8.1 – AUTHORITY OF THE CONSULTANT.
- 8.4.2 Nothing in Part 8 of the General Conditions – DISPUTE RESOLUTION shall be construed in any way to limit a party from asserting any statutory right to a lien under applicable lien legislation of the jurisdiction of the *Place of the Work* and the assertion of such right by initiating judicial proceedings is not to be construed as a waiver of any right that party may have under paragraph 8.3.6 of GC 8.3 – NEGOTIATION, MEDIATION AND ARBITRATION to proceed by way of arbitration to adjudicate the merits of the claim upon which such a lien is based.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

- 9.1.1 The *Contractor* shall protect the *Work*, the *Owner's* property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Contractor's* operations under the *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:
- .1 errors or omissions in the *Contract Documents*; or
 - .2 acts or omissions by the *Owner*, the *Consultant*, *Other Contractors*, or their agents and employees.
- 9.1.2 Before commencing any work, the *Contractor* shall determine the location of all underground utilities and structures indicated in the *Contract Documents* or that are reasonably apparent in an inspection of the *Place of the Work*.
- 9.1.3 Should the *Contractor* in the performance of the *Contract* damage the *Work*, the *Owner's* property or property adjacent to the *Place of the Work*, the *Contractor* shall be responsible for making good such damage at the *Contractor's* expense.
- 9.1.4 Should damage occur to the *Work* or the *Owner's* property for which the *Contractor* is not responsible, as provided in paragraph 9.1.1, the *Contractor* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner's* property. The *Contract Price* and *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- 9.2.1 For the purposes of applicable legislation related to toxic and hazardous substances, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.2.2 Prior to the *Contractor* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
 - .2 provide the *Consultant* and the *Contractor* with a written list of any such substances that are known to exist and their locations.
- 9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substance exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Contractor* commencing the *Work*.
- 9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless any toxic or hazardous substance which was present at the *Place of the Work* prior to the *Contractor* commencing the *Work*.
- 9.2.5 If the *Contractor*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
 - .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*, which were not brought to the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Contractor* shall
 - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substance exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
 - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.

- 9.2.6 If the *Owner* and the *Contractor* do not agree on the existence, significance of, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.
- 9.2.7 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall promptly at the *Owner's* own expense:
- .1 take all steps as required under paragraph 9.2.4;
 - .2 reimburse the *Contractor* for the costs of all steps taken pursuant to paragraph 9.2.5;
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in 9.2.6 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay; and
 - .4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.
- 9.2.8 If the *Owner* and the *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Contractor* shall promptly at the *Contractor's* own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substances;
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the place of the *Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
 - .4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.
- 9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

GC 9.3 ARTIFACTS AND FOSSILS

- 9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place or Work* shall, as between the *Owner* and the *Contractor*, be deemed to be the absolute property of the *Owner*.
- 9.3.2 The *Contractor* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items.
- 9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Owner*, through the *Consultant*, shall issue appropriate instructions for a change in the *Work* as provided in GC 6.2 – CHANGE ORDER or GC 6.3 – CHANGE DIRECTIVE.

GC 9.4 CONSTRUCTION SAFETY

- 9.4.1 The *Contractor* shall be responsible for establishing, initiating, maintaining, and supervising all health and safety precautions and programs in connection with the performance of the *Work* in accordance with the applicable health and safety legislation.
- 9.4.2 The *Owner* and the *Contractor* shall comply with all health and safety precautions and programs established at the *Place of the Work*.
- 9.4.3 The *Owner* and the *Contractor* shall comply with the rules, regulations and practices required by the applicable health and safety legislation.
- 9.4.4 The *Owner* shall cause the *Consultant*, *Other Contractors* and the *Owner's* own forces to comply with all health and safety precautions and programs established by the *Contractor* at the *Place of the Work*.
- 9.4.5 Nothing in this *Contract* shall affect the determination of liability under the applicable health and safety legislation.

GC 9.5 MOULD

- 9.5.1 If the *Contractor* or the *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,
- .1 the observing party shall promptly report the circumstances to the other party in writing,
 - .2 the *Contractor* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould, and

- .3 if the *Owner* and the *Contractor* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.
- 9.5.2 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Contractor*'s operations under the *Contract*, the *Contractor* shall promptly, at the *Contractor*'s own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould,
 - .2 make good any damage to the *Work*, the *Owner*'s property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and
 - .4 indemnify the *Owner* as required by GC 13.1 – INDEMNIFICATION.
- 9.5.3 If the *Owner* and the *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Contractor*'s operations under the *Contract*, the *Owner* shall promptly, at the *Owner*'s own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould,
 - .2 reimburse the *Contractor* for the cost of taking the steps under paragraph 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 – PROTECTION OF WORK AND PROPERTY,
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in paragraph 9.5.1.3 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay, and
 - .4 indemnify the *Contractor* as required by GC 13.1 – INDEMNIFICATION.
- 9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 – MOULD.

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

- 10.1.1 The *Contract Price* shall include all taxes and customs duties in effect at the time of the bid closing except for *Value Added Taxes* payable by the *Owner* to the *Contractor* as stipulated in Article A-4 of the Agreement – CONTRACT PRICE.
- 10.1.2 Any increase or decrease in costs to the *Contractor* due to changes in taxes and duties after the time of the bid closing shall increase or decrease the *Contract Price* accordingly.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- 10.2.1 The laws of the *Place of the Work* shall govern the *Work*.
- 10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or for which the *Contract Documents* specify as the responsibility of the *Contractor*.
- 10.2.3 The *Contractor* shall be responsible for the procurement of permits, licences, inspections, and certificates, which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Contract Price* includes the cost of these permits, licences, inspections, and certificates, and their procurement.
- 10.2.4 The *Contractor* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.
- 10.2.5 The *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will issue the changes required to the *Contract Documents* as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 – CHANGE ORDER and GC 6.3 – CHANGE DIRECTIVE.

- 10.2.6 If the *Contractor* fails to advise the *Consultant* in writing; fails to obtain direction as required in paragraph 10.2.5; and performs work knowing it to be contrary to any laws, ordinances, rules, regulations, or codes; the *Contractor* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations, or codes.
- 10.2.7 If, subsequent to the time of bid closing, changes are made to applicable laws, ordinances, rules, regulations, or codes of authorities having jurisdiction which affect the cost of the *Work*, either party may submit a claim in accordance with the requirements of GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

GC 10.3 PATENT FEES

- 10.3.1 The *Contractor* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The *Contractor* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Contractor* or anyone for whose acts the *Contractor* may be liable.
- 10.3.2 The *Owner* shall hold the *Contractor* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, the physical model, plan or design of which was supplied to the *Contractor* as part of the *Contract*.

GC 10.4 WORKERS' COMPENSATION

- 10.4.1 Prior to commencing the *Work*, and again with the *Contractor*'s applications for payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*.

PART 11 INSURANCE

GC 11.1 INSURANCE

- 11.1.1 Without restricting the generality of GC 13.1 – INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the requirements of which are specified in CCDC 41 'CCDC Insurance Requirements' in effect at the time of bid closing except as hereinafter provided:
- .1 General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Ready-for-Takeover*. Liability coverage shall be provided for completed operations hazards from the date of *Ready-for-Takeover* on an ongoing basis for a period of 6 years following *Ready-for-Takeover*.
 - .2 Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
 - .3 Unmanned aerial vehicle aircraft, manned aircraft or watercraft Liability Insurance when owned or non-owned manned or unmanned aircraft or watercraft are used directly or indirectly in the performance of the *Work*.
 - .4 "Broad form" property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The "Broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
 - (1) 10 calendar days after the date of *Ready-for-Takeover*;
 - (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*; and
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
 - .5 Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Ready-for-Takeover*.
 - .6 The "Broad form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:
 - (1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except

that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;

- (2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*; and
- (3) to the *Work* arising from the work of the *Owner*, the *Owner's* own forces or *Other Contractors*, the *Owner* shall, in accordance with the *Owner's* obligations under the provisions relating to construction by the *Owner* or *Other Contractors*, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.

- .7 *Contractors' Equipment Insurance* from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.
- .8 *Contractors' Pollution Liability Insurance* from the date of commencement of the *Work* until one year after the date of *Ready-for-Takeover*.

- 11.1.2 Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the *Work*.
- 11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the *Contract*.
- 11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and give evidence to the *Contractor* and the *Consultant*. The *Contractor* shall pay the cost thereof to the *Owner* on demand or the *Owner* may deduct the cost from the amount which is due or may become due to the *Contractor*.
- 11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*.
- 11.1.6 If a revised version of CCDC 41 is published, which specifies reduced insurance requirements, the parties shall address such reduction, prior to the *Contractor's* insurance policy becoming due for renewal, and record any agreement in a *Change Order*.
- 11.1.7 If a revised version of CCDC 41 is published, which specifies increased insurance requirements, the *Owner* may request the increased coverage from the *Contractor* by way of a *Change Order*.
- 11.1.8 A *Change Directive* shall not be used to direct a change in the insurance requirements in response to the revision of CCDC 41.

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

- 12.1.1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are limited to the following:
 - .1 The *Consultant* has certified or verified the *Substantial Performance of the Work*.
 - .2 Evidence of compliance with the requirements for occupancy or occupancy permit as prescribed by the authorities having jurisdiction.
 - .3 Final cleaning and waste removal at the time of applying for *Ready-for-Takeover*, as required by the *Contract Documents*.
 - .4 The delivery to the *Owner* of such operations and maintenance documents reasonably necessary for immediate operation and maintenance, as required by the *Contract Documents*.
 - .5 Make available a copy of the as-built drawings completed to date on site.
 - .6 Startup, testing required for immediate occupancy, as required by the *Contract Documents*.
 - .7 Ability to secure access to the *Work* has been provided to the *Owner*, if required by the *Contract Documents*.
 - .8 Demonstration and training, as required by the *Contract Documents*, is scheduled by the *Contractor* acting reasonably.
- 12.1.2 If any prerequisites set forth in paragraphs 12.1.1.3 to 12.1.1.6 must be deferred because of conditions reasonably beyond the control of the *Contractor*, or by agreement between the *Owner* and the *Contractor* to do so, *Ready-for-Takeover* shall not be delayed.
- 12.1.3 When the *Contractor* considers that the *Work* is *Ready-for-Takeover*, the *Contractor* shall deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with a written application for *Ready-for-Takeover* for review. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.
- 12.1.4 The *Consultant* will review the *Work* to verify the validity of the application and will promptly, and in any event, no later than 10 calendar days after receipt of the *Contractor's* list and application:

- .1 advise the *Contractor* in writing that the *Work* is not *Ready-for-Takeover* and give reasons why, or
- .2 confirm the date of *Ready-for-Takeover* in writing to each of the *Owner* and the *Contractor*.

12.1.5 Immediately following the confirmation of the date of *Ready-for-Takeover*, the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

12.1.6 The provision of GC 12.1 – READY-FOR-TAKEOVER shall be subject to GC 12.2 – EARLY OCCUPANCY BY THE OWNER.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

12.2.1 The *Owner* may take occupancy of a part or the entirety of the *Work* before *Ready-for-Takeover* has been attained only as agreed by the *Contractor* which agreement shall not be unreasonably withheld.

12.2.2 The *Owner* shall not occupy a part or the entirety of the *Work* without prior approval by authorities having jurisdiction.

12.2.3 If the *Owner* takes occupancy of a part of the *Work* before *Ready-for-Takeover* has been attained:

- .1 The part of the *Work* which is occupied shall be deemed to have been taken over by the *Owner* as from the date on which it is occupied.
- .2 The *Contractor* shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the *Owner*.
- .3 The warranty period specified in paragraph 12.3.1 of GC 12.3 – WARRANTY for that part of the *Work* shall start from the date on which it is occupied.

12.2.4 If the *Owner* takes occupancy of the entirety of the *Work* before all the prerequisites are met as described in paragraph 12.1.1 of GC 12.1 – READY-FOR-TAKEOVER, the *Work* shall, subject to the requirements of the applicable lien legislation, be deemed to achieve *Ready-for-Takeover*. This shall not relieve the *Contractor*'s responsibility to complete the *Work* in a timely manner.

GC 12.3 WARRANTY

12.3.1 Except for extended warranties as described in paragraph 12.3.6, the warranty period under the *Contract* is one year from the date when *Ready-for-Takeover* has been attained.

12.3.2 The *Contractor* shall be responsible for the proper performance of the *Work* to the extent that the design and *Contract Documents* permit such performance.

12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Contractor Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.

12.3.4 Subject to paragraph 12.3.2, the *Contractor* shall correct promptly, at the *Contractor*'s expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.

12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.

12.3.6 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1, shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Contractor*'s responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

13.1.1 Without restricting the parties' obligation to indemnify respecting toxic and hazardous substances, patent fees and defect in title claims all as described in paragraphs 13.1.4 and 13.1.5, the *Owner* and the *Contractor* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to their involvement as parties to this *Contract*, provided such claims are:

- .1 caused by:
 - (1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose negligent acts or omissions that party is liable, or
 - (2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and
- .2 made by *Notice in Writing* within a period of 6 years from the *Ready-for-Takeover* date or within such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.

The parties expressly waive the right to indemnity for claims other than those provided for in this *Contract*.

- 13.1.2 The obligation of either party to indemnify as set forth in paragraph 13.1.1 shall be limited as follows:
- .1 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the minimum liability insurance limit for one occurrence, of the applicable insurance policy, as referred to in CCDC 41 in effect at the time of bid closing.
 - .2 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Contract Price* as recorded in Article A-4 – CONTRACT PRICE or \$2,000,000, but in no event shall the sum be greater than \$20,000,000.
 - .3 In respect to indemnification by a party against the other with respect to losses suffered by them, such obligation shall be restricted to direct loss and damage, and neither party shall have any liability to the other for indirect, consequential, punitive or exemplary damages.
 - .4 In respect to indemnification respecting claims by third parties, the obligation to indemnify is without limit.
- 13.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 13.1.1 and 13.1.2 shall be inclusive of interest and all legal costs.
- 13.1.4 The *Owner* and the *Contractor* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.
- 13.1.5 The *Owner* shall indemnify and hold harmless the *Contractor* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:
- .1 as described in paragraph 10.3.2 of GC 10.3 – PATENT FEES, and
 - .2 arising out of the *Contractor*'s performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.
- 13.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Contractor*:
- .1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based become known; and
 - .2 should any party be required as a result of its obligation to indemnify another to pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

GC 13.2 WAIVER OF CLAIMS

- 13.2.1 Subject to any lien legislation applicable to the *Place of the Work*, the *Contractor* waives and releases the *Owner* from all claims which the *Contractor* has or reasonably ought to have knowledge of that could be advanced by the *Contractor* against the *Owner* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:
- .1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* no later than 5 calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work* or 20 calendar days following the *Ready-for-Takeover* date, whichever is later;
 - .2 indemnification for claims advanced against the *Contractor* by third parties for which a right of indemnification may be asserted by the *Contractor* against the *Owner* pursuant to the provisions of this *Contract*;
 - .3 claims respecting toxic and hazardous substances, patent fees and defect in title matters for which a right of indemnity could be asserted by the *Contractor* pursuant to the provisions of paragraphs 13.1.4 or 13.1.5 of GC 13.1 – INDEMNIFICATION; and
 - .4 claims resulting from acts or omissions which occur after the *Ready-for-Takeover* date.
- 13.2.2 The *Contractor* waives and releases the *Owner* from all claims resulting from acts or omissions which occurred after the *Ready-for-Takeover* date except for:
- .1 indemnification respecting third party claims, and claims respecting toxic and hazardous substances, patent fees and defect in title matters, all as referred in paragraphs 13.2.1.2 and 13.2.1.3; and
 - .2 claims for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* within 395 calendar days following the *Ready-for-Takeover* date.
- 13.2.3 Subject to any lien legislation applicable to the *Place of the Work*, the *Owner* waives and releases the *Contractor* from all claims which the *Owner* has or reasonably ought to have knowledge of that could be advanced by the *Owner* against the *Contractor* under the *Contract*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the *Ready-for-Takeover* date, except as follows:
- .1 claims arising prior to or on the *Ready-for-Takeover* date for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* no later than 20 calendar days following the *Ready-for-Takeover* date;

- .2 indemnification for claims advanced against the *Owner* by third parties for which a right of indemnification may be asserted by the *Owner* against the *Contractor* pursuant to the provisions of this *Contract*;
 - .3 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor* pursuant to the provisions of paragraph 13.1.4 of GC 13.1 – INDEMNIFICATION;
 - .4 damages arising from the *Contractor*'s actions which result in substantial defects or deficiencies in the *Work*. "Substantial defects or deficiencies" mean those defects or deficiencies in the *Work* which affect the *Work* to such an extent or in such a manner that a significant part or the whole of the *Work* is unfit for the purpose intended by the *Contract Documents*;
 - .5 claims arising pursuant to GC 12.3 – WARRANTY; and
 - .6 claims arising from acts or omissions which occur after the *Ready-for-Takeover* date.
- 13.2.4 Respecting claims arising upon substantial defects and deficiencies in the *Work*, as referenced in paragraph 13.2.3.4, and notwithstanding paragraph 13.2.3.5, the *Owner* waives and releases the *Contractor* from all claims except claims for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* within a period of six years from the *Ready-for-Takeover* date, provided that any limitation statute of the Province or Territory of the *Place of the Work* permit such agreement. If the applicable limitation statute does not permit such agreement, the time within which any such claim may be brought shall be such shorter period as may be prescribed by any limitation statute of the Province or Territory of the *Place of the Work*.
- 13.2.5 The *Owner* waives and releases the *Contractor* from all claims arising from acts or omissions which occur after the *Ready-for-Takeover* date, except for:
- .1 indemnification for claims advanced against the *Owner* by third parties, as referenced in paragraph 13.2.3.2;
 - .2 claims respecting toxic and hazardous substances for which a right of indemnity could be asserted by the *Owner* against the *Contractor*, as referenced in paragraph 13.2.3.3;
 - .3 claims arising under GC 12.3 – WARRANTY; and
 - .4 claims for which *Notice in Writing* has been received by the *Contractor* from the *Owner* within 395 calendar days following the *Ready-for-Takeover* date.
- 13.2.6 "Notice in Writing of claim" as provided for in GC 13.2 – WAIVER OF CLAIMS to preserve a claim or right of action which would otherwise, by the provisions of GC 13.2 – WAIVER OF CLAIMS, be deemed to be waived, must include the following:
- .1 a clear and unequivocal statement of an intention to claim;
 - .2 a statement as to the nature of the claim and the grounds upon which the claim is based; and
 - .3 a statement of the estimated quantum of the claim.
- 13.2.7 A claim for lien asserted under the lien legislation prevailing at the *Place of the Work* shall qualify as notice of claim for the purposes of this *Contract*.
- 13.2.8 The party giving the *Notice in Writing* of claim as provided for in GC 13.2 – WAIVER OF CLAIMS shall submit within a reasonable time a detailed account of the amount claimed.
- 13.2.9 Where the event or series of events giving rise to a claim made under paragraphs 13.2.1 or 13.2.3 has a continuing effect, the detailed account submitted under paragraph 13.2.8 shall be considered to be an interim account and the party making the claim shall submit further interim accounts, at reasonable intervals, giving the accumulated amount of the claim and any further grounds upon which such claim is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 13.2.10 Nothing in GC 13.2 – WAIVER OF CLAIMS shall be deemed to affect the rights of the parties under any lien legislation or limitations legislation prevailing at the *Place of the Work*.

INTENT

- .1 The Work of this Contract is governed by and is to be constructed in accordance with the most recent edition of CCDC2 – STIPULATED PRICE CONTRACT.
- .2 Supplementary Specifications modify and take precedence over the specification sections to which they refer. The unaltered portions of the Contract shall remain in effect.

DEFINITIONS

Page 7, Add the following Definitions:

Approved or Approval

Approved or Approval means acceptance by the Consultant in accordance with the Consultant's responsibilities described in Clause GC 2.2 ROLE OF THE CONSULTANT.

Period of Delay

The period of time from *Ready-for-Takeover* date specified in Article A-1, subclause .1.3, and the actual *Ready-for-Takeover* date; if any.

PART 3 – EXECUTION OF THE WORK

GC 3.4 CONSTRUCTION SCHEDULE

Page 12, in Clause 3.4.1.1, delete “prior to the first application for payment” and replace with “not later than two (2) weeks after receipt of the notice of award”.

Page 12, add new clause 3.4.2 as follows:

- 3.4.2 If, at any time, it should appear to the Owner or the Consultant that the actual progress of the Work is behind schedule or is likely to become behind schedule, or if the Contractor has given notice of such to the Owner or the Consultant pursuant to clause 3.4.1.3, the Contractor shall take appropriate steps to cause the actual progress of the Work to conform to the schedule or minimize the resulting delay and shall produce and present to the Owner and the Consultant a recovery plan demonstrating how the Contractor will achieve the recovery of the schedule. If the Contractor intends to apply for a change in the Contract Price in relation to a schedule recovery plan, then the Contractor shall proceed in accordance with General Condition 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

GC 3.5 SUPERVISION

Page 12, add new clause 3.5.3 as follows:

- 3.5.3 The Owner may, at any time during the course of the Work, request the replacement of the appointed representative(s), where the grounds for the request involve conduct which jeopardizes the safety and security of the Site or the Owner's operations. Immediately upon receipt of the request, the Contractor shall make arrangements to appoint a replacement acceptable to the Owner and Consultant.

GC 3.8 SHOP DRAWINGS

Page 12, delete Clause 3.8.2 and replace with the following:

- 3.8.2 Prepare and submit to the Consultant for review, a schedule of the dates for provision, review and return of Shop Drawings. Provide this submission a minimum of two (2) working days prior to the project start-up meeting.

PART 5 - PAYMENT

GC 5.2 APPLICATIONS FOR PAYMENT

Add clause 5.2.9 as follows:

- 5.2.9 The Contractors application shall show the total progress made to date and the progress on the last claim; the claimed progress being the difference. The application shall show the total amount claimed and the amount claimed for the progress made.

GC 5.3 PAYMENT

Add clause 5.3.3 as follows:

- 5.3.3 In addition to the ten percent (10%) holdback, an amount of 2.5% of the contract Value shall be held-back for a period of one year from the date of Substantial Completion of the Work as a performance warranty. This amount shall be in addition to the performance/warranty bond supplied by the contractor at the start of the contract.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

Page 14, after Clause 5.4.1.2, add the following:

- 5.4.1.3 Submit a certificate by lien search to the Owner by a solicitor licensed to practice law in the Province of the Place of the Work, certifying that no lien associated with the Work exists against the Owner's property or Work;
- 5.4.1.4 Submit a clearance letter from the Workers' Compensation Board or provincially equivalent regulatory body; and
- 5.4.1.5 All such documents shall be dated not earlier than the expiry of the lien period as stipulated by the lien legislation in the Place of the Work."
- 5.4.1.6 The Consultant will provide an electronic copy of the Certificate of Substantial Performance and instruct the Contractor to post the certificate at the Site and to website indicated by the lien legislation of the Place of the Work

Add clause 5.4.7, 5.4.8 and 5.4.9 as follows:

- 5.4.7 If, within 60 days after the issue by the Engineer of the Certificate of Substantial Performance, the Contractor has not corrected all deficiencies, the Owner will retain sufficient money to cover the cost of completing the said deficiencies, as determined by the Engineer, in addition to holding monies retained in accordance with the Contract and subject to appropriate legislation of New Brunswick.

- 5.4.8 Notwithstanding the provisions of the preceding paragraphs, the warranty holdback in the amount of two and a half percent (2.5%) of the final contract price shall be retained by the Owner until the expiry of the warranty period of 12 months from the date of substantial completion of work. This amount will be released within 21 days following the expiry of the warranty period, provided that the Contractor has fulfilled all of the requirements of the contract.
- 5.4.9 The Engineer will review the Contractors comprehensive list of items to be completed or corrected (deficiency list). If the list is found to be incomplete, a finding that the project is substantially complete may be withheld until a comprehensive deficiency list is established to the satisfaction of the Consultant. If the Engineer generates a list of deficiencies, the Engineer shall value each item based on experience. The Engineer may also ask the Contractor for information necessary to establish values for items on the deficiency list. If the Contractor disputes the value of any item, then the Contractor must submit a detailed cost estimate for the value of each item. The value of deficiencies may be withheld from payment of the holdback money.

GC 5.5 FINAL PAYMENT

- 5.5.2 Replace “10 calendar days” with “20 Working Days”.

Add GC 5.8 as follows:

GC 5.8 DOCUMENTS REQUIRED AT HOLDBACK RELEASE

At each time the contractor applies for release of holdback (GC 5.6 to 5.7 inclusive), he shall provide the following documentation. Release of holdback will be subject to receipt of the documentation:

- Statutory Declaration (CCDC Document 9A).
- Bonding company acknowledgement and statement of bond status.
- Statutory Declaration by deed search of any liens filed on the Owner’s property from work of the contract.
- Letter of good standing.
- Worker’s Compensation letter of good standing.
- Statement of all outstanding claims against the contract which precede the date of holdback application. Outstanding claims not listed at the date of Release application will later be rejected.
- O&M Manual.

PART 6 – CHANGES IN THE WORK

Page 15, add new clause 6.1.1.3 as follows:

- 6.1.1.3 Changes that do not affect the Contract Price and time by Supplemental Instruction.

GC 6.2 CHANGE ORDER

Page 15, after Clause 6.2.2, add the following:

- 6.2.3 The mark-up on agreed upon changes are as follows:
- .1 Work performed by the Contractor’s own forces will be the cost of the Work plus ten (10%) percent overhead and profit.
 - .2 Work performed by the Subcontractor’s force will be the cost of Work plus 15% overhead and profit. Where the Work can be done by the Contractor’s forces, as solely determined by the

Consultant, but is done by the Subcontractor's forces, the markup for overhead and profit will be limited to ten (10%) percent.

- 6.2.4 Before the approval of any change order over \$1,000 in value the Consultant is entitled to receive, upon request, at a minimum, the following breakdown of cost associated with such change order:
- .1 Labour rates, excluding operators.
 - .2 Equipment rates including operators.
 - .3 Supervisory staff rates.
 - .4 Subcontractor and material or equipment invoices where applicable.
 - .5 Overhead costs including worker's compensation, site trailer cost as applicable, insurance, bonding, small tool expenses, CPP, and EI contributions.
- 6.2.5 No compensation for extra Work or material shall be allowed unless the Consultant issues a Notice in Writing authorizing such Work or material to be ordered in the form of a Change Order, Change Directive, or Supplemental Instruction.
- 6.2.6 No compensation will be allowed for the cost of repairs to Construction Equipment of any kind on the Site except as directed by the Consultant in writing.
- 6.5.7 The price applicable to any Work deleted from the Contract, shall be deducted from the Contract Price and shall be mutually agreed upon by the Contractor and the Consultant. The price shall be comparable to prices quoted on Work of similar nature.

GC 6.4 – CONCEALED OR UNKNOWN CONDITIONS

Page 17, add a new clause 6.4.5 as follows:

- 6.4.5 If the Contractor was given access to the Place of the Work and/or professional reports relating thereto (including, without limitation, environmental, geotechnical, and structural reports) prior to the submission of the bid on which the Contract was awarded, then the Contractor confirms that they have investigated the Place of the Work and, in doing so, applied to that investigation the degree of care and skill required. In those circumstances, notwithstanding the provisions of clause 6.4.1, the Contractor is not entitled to an adjustment to the Contract Price or to an extension of the Contract Time for conditions which could reasonably have been ascertained by the Contractor by such investigation, or which could have been reasonably inferred from the material provided with the Contract Documents. In those circumstances, should a claim arise, the Contractor will have the burden of establishing that it could not have discovered the materially different conditions from an investigation because of restrictions placed on its access or inferred the existence of the conditions from the material provided with the Contract Documents.

GC 6.5 DELAYS

Page 19, after Clause 6.5.5, add the following new Clauses:

- 6.5.6 Should the Contractor fail to attain Ready-for-Takeover for the Work by the date indicated in Article A-1, Clause 1.3 in the AGREEMENT BETWEEN OWNER AND CONTRACTOR, the period of time from this agreed date to the actual date when the Consultant confirms the Work is Ready-for-Takeover, shall be termed the Period of Delay.
- 6.5.7 In the event there is a Period of Delay, the Contractor shall pay to the Owner, as liquidated damages and not as a penalty, the sum of One Thousand Dollars (\$1,000.00) per calendar day for each day of the Period of Delay. The parties acknowledge that the actual damages arising from such delay would be difficult to determine in advance and that the foregoing amount represents a

genuine pre-estimate of the damages likely to be incurred by the Owner. The Owner may deduct any liquidated damages payable under this Contract from any monies due or becoming due to the Contractor.

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

Page 18, add the following new Clause as 6.6.6 and renumber the last and subsequent clause:

- 6.6.6 The Owner may make claims arising out of the costs incurred for additional services provided by the Consultant resulting from the Contractor's failure to reasonably perform the Work in accordance with the terms and conditions of the Contract, including the Contractor's issuance of unnecessary Requests for Information (RFI's). The Consultant will notify the Owner and Contractor where it has been determined that additional services will be required or have been provided in order not to cause a delay. The Owner shall make claims based on the Consultant's invoices.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.4 – CONSTRUCTION SAFETY

Page 24, after GC 9.4.5, add the following:

- "9.4.6 The Contractor shall indemnify and save harmless the Owner, its agents, officers, directors, employees, Consultants, successors, appointees and assigns from and against the consequences of any and all safety infractions committed by the Contractor under the applicable occupational health and safety legislation in the Place of the Work, including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the Owner is not covered by insurance, provided that the indemnity contained in this clause shall be limited to costs and damages resulting directly from such infractions and shall not extend to any consequential, indirect, or special damages."

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

Page 25, delete all clause within GC 10.1 and replace with the following:

- 10.1 Where the Work is funded by a First Nation and takes place on First Nation land, no Value Added Tax will be applied to payments made by the Owner.

GC 10.2 LAWS, NOTICES, PERMITS AND FEES

- 10.2.3 Include obtaining utility permits (phone, power, etc.) and their fees, license, inspections, certificates, co-ordination, scheduling and costs in the tender price & the scope of work. Where a utility or agency requires that an application be made by the Owner, advise the Owner sufficiently far in advance so as not to delay the work and thereafter act as the Owner's agent in scheduling and co-ordinating the utility/agency with those of the work. Co-ordinate and pay for adjustment of utility poles and their supports, if required for the purposes of the work, with/to the utility having jurisdiction. Carry ongoing utility costs until Substantial Performance.

Page 24, add the following new Add Clause 10.2.8

10.2.8 The Contractor shall schedule his work in accordance with permits issued and any stipulations contained therein. The Contractor shall notify the Owner and the Engineer of any restrictions placed on the work schedule by such permits. The Contractor shall notify the Engineer of any difficulty in obtaining permits and their impact on the schedule. Notification to the Engineer does not relieve the Contractor of his obligations.

PART 11 INSURANCE

GC 11.1 INSURANCE

Add Clause 11.1.1.9 as follows:

11.1.1.9 The Contractor shall add the Owner and Engineer as joint insured parties (co-insured) in the insurance policies.

GC 12.3 WARRANTY

Add clause 12.3.7 as follows:

12.3.7 Equipment warranty: all equipment shall be warrantied by the manufacturer for a period of 12 months from the date of successful commissioning and placing in service.

Add clause 12.3.8 as follows:

“All Work of repair or replacement carried out during the warranty period shall be maintained for a period of one (1) year from the date of the Consultant’s acceptance of the Work of repair or replacement notwithstanding that the warranty period expires before the expiration of the said year. This clause shall not apply to normal operation maintenance, which shall be carried out by the Owner.”

PART 14 – CONTRACT SECURITY

GC 14.1 CONTRACT SECURITY

Page 28, add new clauses 14.1 and 14.2 as follows:

“14.1 The Contractor shall, prior to commencement of the Work, provide to the Owner a Performance Bond and a Labour and Materials Bond, each in the amount of 50% of the Total Amount Payable or an Irrevocable Letter of Credit in the amount of 20% of the Total Amount Payable. The Irrevocable Letter of Credit shall be issued by a certified financial institution for a period of no less than twelve (12) months after the issue of Substantial Performance Certificate. Include the cost of providing the Irrevocable Letter of Credit in Contract Price. Should it become apparent that the final cost of the project will exceed the Total Amount Payable by more than 10%, the Contractor shall arrange to have his bonds or Irrevocable Letter of Credit reissued, based on the projected final cost.”

14.2 The contract security will be retained until the expiration of the warranty period.”

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION

- .1 The work to be done under this Contract consists generally of the supply of all materials, labour, supervision, construction plant, equipment, etc., necessary for the completion and commissioning of the work that consists of:
 - .1 Installation and commissioning of three (3) packaged Gorman Rupp sewage lift stations supplied by AFNWA.
 - .2 Installation of two (2) 2.1m diameter pre-cast concrete wet wells including all shoring, excavation, backfill, dewatering as required and environmental protection.
 - .3 Reuse of an existing 1.8m diameter wet well including removal of all existing pumps, pump bases, pipes, fittings, etc., removal and replacement of the existing wet well concrete cover.
 - .4 New wet well piping as shown on the drawings.
 - .5 Supply and install new building slabs, installation of new pump station enclosures (provided by Owner).
 - .6 Supply and installation of new sewer, force main and appurtenances.
 - .7 Supply and installation of new pre-cast concrete manholes.
 - .8 Demolition of the three (3) existing pump station buildings, valve chambers, control buildings, slabs and piping as shown on the drawings and the information provided in the specifications.
 - .9 Temporary works including but not limited to bypass pumping, security fencing, traffic control shoring, dewatering etc.
 - .10 Site works and landscaping of properties disturbed as a result of the construction including restoration of surfaces following installation of the pipelines.
 - .11 Other related work all as shown on the Drawings and described in these specifications.
- .2 It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish, install and test such that it is complete and ready for use".
- .3 Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work the same as if herein specified or shown.

1.2 DRAWINGS

- .1 The whole of the work shall agree in all particulars with the levels, measurements and details contained in the Drawings accompanying this Specification, and with such other drawings or information as may from time to time be supplied by the Consultant, or may be supplied by the Contractor and reviewed by the Consultant.

1.3 DATUM

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- .1 Levels shown on the Drawings are referred to the Canadian Geodetic Datum and were established from the NB Grid Monuments in the area. The Contractor shall establish and maintain bench marks of a semi-permanent nature for the duration of the Contract.

1.4 ORIGINAL GROUND ELEVATIONS

- .1 Before commencing work, agree to all levels of the original ground surface with the Consultant.

1.5 PROGRAM OF WORKS

- .1 Upon acceptance of the tender, submit for approval, a program and schedule showing significant Contract dates, and method in which the Contractor proposes to carry out the Works. Provide information regarding the carrying out of the Works and of the Construction Equipment, temporary works, labour and construction crews which the Contractor intends to supply, use or construct as the case may be.
- .2 Also provide within the above time frame a breakdown of the Tender Price into work items to be claimed on monthly progress claim for use by the Consultant when approving claims.
- .3 The submission to and approval by the Consultant of such program and schedule or the furnishing of such particulars shall not relieve the Contractor of any duties or responsibilities under the Contract, nor shall it in any way prejudice the power otherwise vested in the Consultant to order and direct at any time in what order or where the Works shall proceed.

1.6 PHOTOGRAPHS

- .1 Prior to the commencement of the work, the Consultant may arrange for photographs to be taken of the Site of the Works and those properties adjacent to the Site of the Works. Be present during the taking of photographs to make any comments on the conditions of the Site. These photographs, together with a written report on the condition of existing roads, trees, landscaping, and the like, as determined by mutual agreement between the Contractor and Consultant, shall be retained by the Consultant as a record of Site conditions prior to commencement of work.

1.7 ASSISTANCE TO THE CONSULTANT AND THE CONSULTANT'S REPRESENTATIVE

- .1 During the continuance of the Contract, provide necessary labour and tools to assist the Consultant and the Consultant's Representative in measuring, checking, testing and examining the Contractor's work and for the setting out and measurement of the Works. The cost of all such being deemed to be covered by and included in the Contract Price.

1.8 SAMPLES

- .1 Samples of the sizes and quantities as required by the Specifications shall be submitted after the award of Contract. Do not deliver materials for which samples are required to Site for use until representative samples of same have been approved in writing by the Consultant. Provide such samples without charge.

1.9 SHOP DRAWINGS

- .1 Submit shop detail or working drawings and manufacturer's data for all items requiring fabrication, on or off the Site, and for all proprietary equipment to the Consultant for review before any such items or equipment are incorporated into the Works. This review of Shop Drawings by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detailed design inherent in the Shop Drawings, responsibility for which shall remain with the Contractor submitting them, and such review shall not relieve the Contractor of responsibility for errors or omissions in Shop Drawings or of responsibility for meeting all requirements of the Construction and Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of the Work of all trades, subcontractors, and suppliers.
- .2 Submit electronic copies of all relevant shop drawings to the Consultant in PDF format. Where it is not practical to provide electronic copies and where approved by the Consultant, submit three (3) paper copies of shop drawings.
- .3 Submit shop drawings with such promptness as not to cause delay in this Work, or of the Works of any Sub-Contractors.
- .4 The information submitted shall clearly show the dimensions, materials of construction, performance, finish, service and installation requirements and other characteristics in sufficient detail to permit the Consultant to evaluate the suitability of the articles for the use intended.
- .5 Make corrections required by the Consultant as noted, and resubmit corrected copies to the Consultant for review before fabrication.
- .6 The Consultant will mark comments on one (1) copy of each drawing or document submitted and will return this as an electronic copy for the Contractor's purposes.
- .7 The Consultant will not review shop drawings and other material involving a large amount of work in those instances where it is evident that the Contractor has not used all the information contained in, or where such details are obviously not consistent with the Contract Documents.
- .8 Provide the section number of the specification with each submitted shop drawing for the purpose of identification.

1.10 TESTING

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- .1 Provide such assistance, labour and materials as are normally required for examining, measuring and testing the quality, weight or quantity of any material used, and shall supply samples of materials before incorporation in the Works for testing as may be selected and required by the Consultant.
 - .2 Perform or arrange for performance of tests on equipment in complete accordance with relevant clauses of these Specifications and in the presence of the Consultant.
 - .3 The Contractor shall have no claim against the Authority or the Consultant in respect of any financial loss which the Contractor may suffer from the rejection of any materials or equipment due to their failure to meet the specified test requirements. Bear the cost of remedying any defects such that the material or equipment will meet the specified tests, or failing this, of removing the material or equipment from the Site. The decision to repair or replace materials and equipment which have failed to meet test requirements will be made by the Consultant.

1.11 STANDARD SPECIFICATIONS

- .1 Reference has been made to certain Domestic, National and International Standard Specifications throughout the various sections of the Specification contained herein. These Standard Specifications shall be considered an integral part hereof and shall be read in conjunction with the Drawings and Specifications as if they were reproduced herein. Be completely familiar with their contents and requirements. The latest editions of these Standard Specifications at the time of tendering shall always govern.

1.12 ACCOMMODATION OF PROPERTY OWNERS

- .1 Make adequate provision, at own expense, for the accommodation and protection of adjacent properties and lands. Repair any damage at no additional cost to the Contract.

1.13 TREES

- .1 Carefully preserve trees within the site of the Works as far as possible during the period of construction. Remove or relocate trees within the limits of the work as directed by the Consultant. Protect trees adjacent to the Site of the Works.

1.14 LIGHTING AND BARRICADES

- .1 Protect persons from injury and avoid property damage by providing barricades, construction signs, torches, flashers, and guards as required during the progress of the construction work. Enclose all material piles, equipment, plant or construction equipment which may serve as obstructions by fences or barricades. Protect by proper lights when visibility is poor.

1.15 MAINTENANCE OF SITE ACCESS

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- .1 During the Contract period, maintain access to site of the Works as required. Such access shall be by means of existing paved roads, existing gravel or unmade roads, or other existing tracks wherever these are public rights-of-way and private rights-of-way. In the absence of suitable or convenient existing public access, arrange for use of private rights-of-way or other means of access in accordance with the Contract wherever required.
 - .2 Maintain access to and within the Site of the Works to permit the execution of the Contractor's own work of the Contract and by all other persons and traffic properly entitled to such access.
 - .3 Obtain, provide and maintain suitable detours, and post signs wherever access over a public right-of-way must necessarily be denied because of the work of the Contract, with the approval and requirements of the authorities having jurisdiction therein.
 - .4 Make provision for flag persons to direct traffic during the execution of the Work at no extra cost to the Contract.

1.16 SAFETY

- .1 Observe construction safety measures of Provincial Government, including but not limited to the Occupational Health and Safety Act of New Brunswick; Workers Health Safety and Compensation Commission and Municipal Authority provided that in any case of conflict or discrepancy the more stringent requirement shall apply.
- .2 Ensure that volatile waste is stored in closed containers and removed from premises daily.
- .3 WHMIS: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.
- .4 Ensure that pollution and environmental control of construction activities are exercised as specified and as required during the Work.

1.17 DAMAGE AND INJURY

- .1 Bear the cost of repairing damage to the Site, property of others and injuries to persons resulting from operation under the Contract.
- .2 Immediately inform the Consultant of damage or injury to persons, property, services or materials.
- .3 Relocate survey markers, monuments, and pins moved during the construction of the works, under the direction of a qualified provincial land surveyor.

1.18 FLOATATION AND FLOODING

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- .1 Water at the site may on occasion rise to such level as to cause floatation or other damage to pipes or structures. Observe all floatation or flooding during construction, and be responsible for floatation or flooding.

1.19 ENVIRONMENTAL PROTECTION

- .1 Provide Environmental Protection in accordance with requirements of New Brunswick Department of Environment.
- .2 Do not bury rubbish and waste materials on site.
- .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .4 Carry out work in such a manner that erosion of bare ground surfaces is minimized. Control run-off water containing erosion products so that streams, ponds and lakes will not be subject to unnatural siltation and the water quality deteriorated by the addition of turbidity.
- .5 In general, direct run-off accumulating or diverted as a result of construction activities into shallow settling basins excavated for the purpose or to intercept run-off by frequent check dams or ditches across the drainage path, with the outflow in every case discharged so that sheet flow through the existing ground cover takes place to filter and retard the flow.
- .6 Control disposal or runoff of water containing suspended materials or other harmful substances with use of siltation fences, sedimentation ponds, sedimentation blanket, slope stabilization and the like, all in accordance with required environmental regulations and permits.
- .7 Carry out such control measures in a deliberate conscientious and timely manner having due regard to the weather conditions and also in accordance with instructions or recommendations from time to time made by representatives of the agency having jurisdiction or by the Consultant.
- .8 Do not operate construction equipment in watercourses without obtaining necessary permits.
- .9 Maintain temporary erosion and pollution control devices installed under this Contract.
- .10 Re-establish ground cover as soon as the season permits, in accordance with the appropriate provisions in other sections of this Specification.

1.20 UTILITIES

- .1 Do not operate valves, electrical, telephone or other controls on existing utility systems. Should it become necessary for the Contractor to operate such a control or make connection to such a system, do so only on the direct instruction of a representative of the utility concerned. Carry out such work in accordance with the specific instructions of the said representative. When the construction work passes under and/or in close

proximity to underground utility cables or utility poles, include in the unit price the cost for having a representative of the utility company present during the work.

- .2 Provide a letter from the owners of utilities, stating that all services damaged during construction of the Works have been repaired, when requested by the Consultant.

1.21 WATER AND ELECTRICITY CONSTRUCTION

- .1 Provide or arrange for, at own expense, water and electricity for construction purposes for use in the Works.
- .2 Provide temporary light and power for all construction needs by temporary feeders in approved locations from the nearest available services, all at the Contractor's expense.
- .3 Water and electrical systems installed under this Contract may be used for construction requirements provided that guarantees are not affected thereby and all costs arising out of such use shall be assumed by the Contractor.

1.22 WEATHER CONDITIONS

- .1 Do not perform work when the weather is unsuitable. Do not place concrete, masonry, earth backfill, embankment, paving, or paint during freezing weather or upon frozen material unless approved in writing by the Consultant. When work is performed during freezing weather, provide necessary means for heating, and heat materials required in the work. Take necessary precautions to bond new work to old, if there is delay or interruption in the work due to weather conditions.

1.23 FIRST AID

- .1 During the progress of the Works, provide and maintain in easily accessible positions on the Works adequate first aid kits equal to those required by the Workers' Compensation Act for the free use as necessary of all persons on the Site.
- .2 Provide minimum one person on site at all times trained and certified in Emergency First Aid.

1.24 SANITATION

- .1 Provide and maintain, so long as any workers are employed on the Works, adequate sanitary conveniences for their use. Provision, maintain and remove sanitary conveniences in accordance with the requirements of all pertinent health regulations and to the approval of the Consultant.

1.25 MATERIALS AND WORKMANSHIP

- .1 All equipment, materials and workmanship shall be the best of the respective kinds described in the Contract and in accordance with the Consultant's instructions and shall

be subjected from time to time to such standard tests as the Consultant may direct at the place of manufacture or fabrication or on the Site.

- .2 Before ordering any materials for incorporation in the Works inform the Consultant of the names of the persons or firms from whom the Contractor desires to obtain such materials and, except as regards trifling and unimportant matters, no order for such materials shall be given except with the authorization of the Consultant. Notwithstanding the fact that such authorization may have been given, the Consultant may forbid the use of any such materials, if upon delivery, they are found to be defective or if the Consultant considers them unsuitable for incorporation in the Works. Keep the Consultant fully advised of the orders and delivery dates of materials.
- .3 Temporary storage is restricted to lots zoned to permit storage of aggregate, bedding materials, site sheds, equipment and the like.
- .4 Obtain approval and pay for use of storage or work areas needed for operation.

1.26 EQUIPMENT AND PLANT SUPPLIED BY THE CONTRACTOR

- .1 All material and equipment required to be incorporated into the Work shall be new and unused. Material found during the progress of the Work to have cracks, flaws, or other defects will be rejected by the Consultant.
- .2 Replace all such materials and equipment found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labour required for the replacement of installed material and equipment discovered defective prior to the final acceptance of the work.

1.27 HANDLING AND STORAGE

- .1 Deliver and distribute materials furnished by or to the Contractor at the Site. Load and unload to avoid shock or damage or dropping. Repair or replace damaged material, as approved by the Consultant, at no additional cost to the Contract.
- .2 Adequately store and protect all materials and equipment intended for the work, until it has been incorporated in the completed project. Keep interior of all machinery, pipe, fittings, and other accessories free from dirt and foreign matter at all times.
- .3 Obtain approval, and pay for use of storage or work areas needed for operation.

1.28 EQUIVALENTS AND ALTERNATES

- .1 Where any particular brand of manufactured articles is described or specified, it is to be regarded as a standard, but another brand equally as good may be accepted, at the discretion of the Consultant. No change in the Specification will be made prior to the acceptance of the tenders. If the Contractor wishes to make a substitution after the Contract has been awarded, make application, in writing, otherwise the Contractor will be held to the terms of the Specifications. No extra cost will be allowed for approved equivalents.

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- .2 When the Authority is prepared to permit the use of a brand of manufactured article as an alternative to any specified brand of manufactured article even though such alternative may not be equivalent to that specified, it may be used at the discretion of the Consultant but only after price adjustments have been negotiated and approved by the Consultant.
 - .3 If the alternative requires modifications, adjustments or additions to the specified works, submit to the Consultant, drawings and specifications for these modifications, adjustments or additions in the same detail as presented in the Contract. Approval in principle by the Consultant of these modifications, adjustments or additions in no way relieves the Contractor of any obligations or liabilities under the contract to provide for a finished piece of work complete and operational in all essentials.
 - .4 No change or substitution can be made without the written consent of the Consultant.
 - .5 The Consultant will record the time required to evaluate equivalents and alternates proposed by the Contractor including making changes to the Contract Documents occasioned thereby. Whether or not the Consultant accepts a proposed substitute, the Contractor shall reimburse the Authority for the charges of the Consultant for evaluating any proposed substitute.

1.29 SITE TO BE CLEAN

- .1 Keep the work, all property, road surfaces, etc., in the vicinity of the Works and in areas where the Contractor's trucks will travel, in a clean and orderly condition, free from dirt, dust, snow, ice, rubbish, etc. at all times during the progress of the work.
- .2 Maintain trucks so that no spillage will occur. Before leaving the Site, trim loads and free wheels of accumulations of soil.
- .3 Keep Site free from accumulations of waste material and rubbish to prevent an unsightly or hazardous condition. On the completion of the Works clear away and remove from the Site all Construction Equipment, surplus materials, rubbish and temporary works of every kind and leave the whole of the Site and works clean in a workmanlike condition to the approval of the Consultant.
- .4 Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

1.30 GUARANTEE

- .1 The Contract requires an operational combination of several components comprising the Works which are customarily guaranteed by their suppliers. Under this Contract, however, the Contractor shall provide a guarantee for the Works for a period of one (1) year following the date of continuous operation. The terms of the Guarantee shall be as follows:
 - .1 Where failure or incipient failure of the material is apparent, the Contractor shall actively commence repair or other remedy not more than twenty-four (24) hours after receiving notice of trouble.
 - .2 If the Contractor, on being notified, does not for any reason commence repairs within twenty-four (24) hours, the Authority shall have the right to have repairs

made by others as necessary to restore or continue service. The cost of such repairs by others is to be borne by the Contractor. The Authority shall at all times inform or attempt to inform the Contractor before hiring others to effect any repairs and it shall be at all times the Contractor's right to be informed as soon as possible of difficulties and proposed remedial action by others to make or where practical to complete such repairs at any other time of the guarantee period in preference to others.

- .3 The employment of some other person or persons for reasons set out shall in no wise affect the Contractor's obligation or liability hereunder or relieve him of the performance and fulfillment of any or all of his covenants, undertakings, obligations, or duties under the Contract.
- .4 After the acceptance by the Consultant and during the guarantee period, the burden of maintenance shall fall upon the Authority. In the event of damage, failure or incipient failure of any part or parts directly attributable to inadequate or improper maintenance, the Contractor shall be responsible for remedial action but the cost of all such repairs will be reimbursed by the Authority.
- .5 If the Contractor arranges that the manufacturer of some component or some other party approved by the Consultant provide the guarantee as his agent under the Contract in which case due notice to the Agent will be taken as due notice to the Contractor. This will be a matter for Contractor's convenience only, and shall in no way affect the Contractor's obligations and liabilities hereunder or relieve him from the performance and fulfillment of any or all of his covenants, undertakings, or duties under this contract.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Temporary and/or permanent control measures to protect plants, watercourses and surrounding property from environmental pollution and damage.

1.2 REFERENCES

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 Provide environmental protection measures as specified under this Section and in accordance with Watercourse and Wetland Alteration Technical Guidelines, January 2012, issued by New Brunswick Department of Environment and Local Government.

1.3 DEFINITIONS

- .1 Erosion: A combination of processes in which materials of the earth's surface are loosened, dissolved, or worn away, and transported from one place to another by natural agents.
- .2 Sedimentation: The addition of soils to water bodies by natural and human related activities.
- .3 Storm Water Runoff: Precipitation that does not soak into the ground or evaporate but flows along the surface of the ground as runoff.
- .4 Erosion and Sediment Control (ESC) Plan: Plan Identifying the applicable stabilization and structural strategies that will be employed to limit sediment and erosion during construction.
- .5 Environmental Pollution and Damage: Presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .6 Environmental Protection: Prevent/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4 SUBMITTALS

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- .1 Submit Erosion and Sedimentation Control Implementation Plan, specific to the project site.
 - .2 At least monthly during construction, the Construction Manager will submit weekly photographs taken during construction depicting the measures from the ESC Plan in place. Each photograph must be date-stamped and annotated to clearly identify the ESC measure featured.
 - .3 For minor ESC measure maintenance corrective action reports are required by close of the next workday starting from when photo is taken noting that corrective action is required. In the case of major maintenance (replace of ESC control or additional ESC control measures required on-site), corrective actions reports are required within 7 calendar days of photo taken noting that major maintenance is required. All correction action reports must state the following:
 - .1 Name, Title.
 - .2 Summary of corrective actions.
 - .3 Location on-site for maintenance.
 - .4 Photo(s) documenting corrective action.
 - .5 Signature.

1.5 EROSION AND SEDIMENT CONTROL (ESC) PLAN

- .1 Draft ESC Plan: Submit to the Owner/Engineer for review within five (5) days after receipt of Notice of Award of Bid, or prior to commencement of Work, whichever occurs sooner.
 - .1 Intended sequence of major construction activities, the following must be included:
 - .1 Date of installation of ESC Controls.
 - .2 Commencement and duration of each period of earth-disturbing activities (clearing, grubbing, mass grading, excavating, cutting and filling.
 - .3 Temporary or permanent stopping of construction activities on-site or designated portions of the site.
 - .4 Final or temp stabilization areas of exposed soil.
 - .5 Removal of temporary stormwater control measures, removal or construction equipment and vehicles.
 - .2 Total area of site and area intended for excavations, clearing and grubbing.
 - .3 Total area of site expected to be disturbed at one time.
 - .4 Selection and description of all temporary and permanent stabilization, erosion and sediment control and storm water control measures implemented on the project site including the following details:
 - .1 Date of implementation.
 - .2 Date of removal.
 - .3 Personnel responsible for installation.
 - .4 Personnel responsible for maintenance activities.
 - .5 Expected maintenance required for ESC control.
 - .6 Stage of construction in relation to site grading.
 - .5 Description(s) of stabilization practices implemented on-site.

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- .6 Air pollution controls detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off site project.
 - .7 Spill prevention procedures.
 - .8 Waste management procedures.
 - .9 Stockpile locations for excess and new soil and gravel materials including methods to control runoff and to contain materials on site.
 - .10 Statement of physical ESC Plan location on-site.
- .2 The ESC plan must describe the measures implemented to accomplish the following objectives:
 - .1 Prevent loss of soil during construction by storm water runoff and/or wind erosion including protecting topsoil by stockpiling for reuse.
 - .2 Prevent sedimentation of storm sewer or receiving streams.
 - .3 Prevent polluting the air with dust and particulate matter.
 - .4 Establish long-term soil stabilization program.
 - .3 Final ESC Plan: Allow 7 days for Owner/Engineer review of Draft ESC Plan. Owner/Engineer will return Draft ESC Plan with comments. Revise ESC Plan to incorporate Owner/Engineer's comments. Once the Owner/Engineer has determined the erosion and sediment control measures and strategies are acceptable, the Contractor to submit, within five (5) calendar days a Final ESC Plan.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 EROSION AND SEDIMENT CONTROL PLAN IMPLEMENTATION

- .1 Manager: Contractor to designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the ESC Plan for the project.
- .2 Distributions: Contractor to distribute copies of ESC Plan to the Job Site Foreman and each Subcontractor.
- .3 Provide permanent and temporary measures identified by the ESC Plan to:
 - .1 Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
 - .2 Prevent sedimentation of storm sewer or receiving streams.
 - .3 Prevent polluting the air with dust and particle matter.
- .4 Limit initial earth disturbance to that necessary to install control measures.

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- .5 Stabilization: Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within:
 - .1 Seven (7) calendar days for the surface of all perimeter controls, and all perimeter slopes.
 - .2 Fourteen (14) calendar days for all other disturbed or graded areas.
 - .6 Use the permanent driveway or entrance location as a stabilized construction entrance. Top dress as necessary to prevent tracking of sediment onto public streets or rights-of-way.
 - .7 At any location where surface runoff from disturbed or graded areas flow off the property, install control measures to prevent sediment from being transported off-site.
 - .8 Swales or other areas that transport concentrated flow to be sodded.
 - .9 Remove control features when directed by the Owner/Engineer. Take care to avoid causing turbidity, and excessive re-suspension of particles when removing control features.
 - .10 The Contractor is to maintain road by means necessary to prevent tracking of sediment, debris and gravel onto the road. If materials get onto the roadway, the Contractor is responsible to clean the road utilizing proper traffic control measures.

3.2 FIRES

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

3.3 DISPOSAL OF WASTES

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

3.4 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer, or drainage systems without prior removal of contaminants.
- .3 Control disposal or runoff of water containing suspended materials or other harmful.

3.5 SITE CLEARING AND GRADING

- .1 Minimize stripping of topsoil and vegetation.

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- .2 Schedule Work to minimize exposure of subsoils to erosion.
 - .3 Perform clearing and grading work to minimize the effects of erosion on site and to the requirements of the ESC Plan.
 - .4 Grading shall not impair existing surface drainage, create an erosion hazard, or create a source of sediment to any adjacent watercourse of property.

3.6 PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties not indicated for removal.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 metres.
- .3 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Cleanly cut roots that need to be removed with sharp hand cutting tools. Cover roots exposed during construction and scheduled to remain with moist soil until permanent root cover is in place.

3.7 WORK ADJACENT TO WATERWAYS

- .1 A Watercourse and Wetland Alteration permit has been obtained for the project. The Contractor is to comply with all requirements of the permit.
- .2 Do not discharge waste waters derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines, directly into storm water system or adjacent waterways.
- .3 Do not discharge rinse water from concrete trucks or mixing drums on site.
- .4 Do not operate construction equipment in waterways.
- .5 Do not use waterway beds for borrow material.
- .6 Do not dump excavated fill, waste material or debris in waterways.
- .7 Storage of fuel to be kept 30m away from the watercourse.

3.8 AIRBORNE POLLUTION AND PARTICULATE CONTROL

- .1 Control emissions from equipment and plant to local authorities' emission requirements.

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- .2 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
 - .3 Demolish to minimize dusting. Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
 - .4 Provide dust control for temporary roads. Control dust by application of water, or calcium chloride after obtaining permission from the Owner/Engineer.
 - .5 Keep paved surfaces clean, including public roadways. Install wheel wash stations for vehicles leaving the site.
 - .6 Cover all site materials and stockpiles with tarps at the end of each day.

3.9 SPILL CONTAINMENT

- .1 Take precautions to avoid contamination of the site from fuel and other petroleum products, fertilizers, paints and coatings, and other hazardous fluids.
- .2 Monitor onsite vehicles for fluid leaks. Implement a preventative maintenance program to keep vehicles free from leaks.
- .3 Keep and maintain hydrocarbon containment and clean up materials on site for the duration of construction activities.
- .4 Ensure personnel are trained in the proper use of containment and clean up materials.

3.10 INSPECTIONS AND MAINTENANCE

- .1 Areas that must be inspected include:
 - .1 All areas that have been cleared, graded, or excavated and that have not yet completed stabilization.
 - .2 All installed stormwater controls (including pollution prevention measures.)
 - .3 Material, waste, borrow, or equipment storage and maintenance areas.
 - .4 All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater.
 - .5 All points of discharge from the site.
 - .6 All locations where stabilization measures have been implemented.
- .2 Inspect ESC control measures at least once each week (unless otherwise noted) and following any significant storm event (13 mm of precipitation or greater). Take photographs during these inspections and at fixed waypoints (as directed by Owner) in order to document compliance.
- .3 Maintain ESC control measures in good working order; correct any deficiencies noted in installed control measures immediately. Ensure photographs are taken pre and post remediation to document corrections made to deficiencies.

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- .4 Stabilized Construction Entrance: Apply additional gravel as required, remove sediments and other materials from areas to minimize clogging. Keep adjacent public roadway(s) free of sediment.

3.11 EMERGENCY NOTIFICATION

- .1 New Brunswick Department of Environment and Local Government (NBDELG), (506-473-7744) (for Grand Falls, NB region).

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This section specifies the requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to complete the removals, relocations and modifications to existing facilities and structures. The work generally includes, but is not limited to removal of piping, valves, and other equipment as indicated on the drawings.
- .2 Removals and relocations of various electrical items, mechanical items as shown on the Project Drawings.

1.2 RELATED WORK

- .1 Electrical: Division 26

1.3 REFERENCES

- .1 Canadian Standards Association (CSA).
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code of Canada, Division B, Part 8.

1.4 EXISTING CONDITIONS

- .1 Items to be demolished or removed are to be based on their existing conditions.

1.5 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures and services. Provide bracing and shoring as required. Repair damage caused by demolition as directed by the Engineer.
- .2 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, cease operations and notify the Engineer.
- .3 Keep noise, dust and inconvenience to occupants and neighbours to a minimum.
- .4 Prevent debris from blocking surface drainage, process, mechanical and electrical systems which must remain in operation.

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- .5 Do not allow demolition work to adversely affect adjacent watercourses, groundwater, and wildlife, or contribute to excess air and noise pollution. If demolition affects above areas in the opinion of the Engineer remediate affected areas at no cost to the Contract.
 - .6 Fires and burning of waste or materials is not permitted on site.
 - .7 Do not bury waste or materials on site.
 - .8 Protect trees, plants and foliage on site and adjacent properties.

1.6 REGULATORY REQUIREMENTS

- .1 Perform demolition work in compliance with applicable Federal, Provincial and Municipal Regulations and CSA S350.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site with Engineer and Owner and verify extent and location of items designated for removal, disposal, recycling, salvage, relocation, and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Disconnect and remove all existing services which are designated to be removed. Disconnect and remove all redundant conduit and wiring back to source.
- .4 Shut off, disconnect and cap mechanical and electrical services where applicable.
- .5 Notify and obtain approval of Owner companies before starting removals.
- .6 Include any and all charges associated with coordinating the work by NB Power or any utility affected by the Work in the Contract Price.
- .7 Where directed to remove existing pipework, fittings, valves, and equipment supported at existing floors, remove associated pipe support structures, anchor bolts and related accessories. Following removal, grind smooth the affected area, and finish to match existing coating system of adjacent areas.
- .8 Prevent debris from blocking drainage inlets.

3.2 SAFETY CODE

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- .1 Observe construction safety measures of Provincial Government, including but not limited to the Occupational Health and Safety Act, provided that in any case of conflict or discrepancy the more stringent requirement will apply.
 - .2 Store volatile waste in closed containers and remove from premises daily.
 - .3 WHMIS:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health Canada.
 - .4 Exercise pollution and environmental control measures as specified and as required during the Work.

3.3 REMOVAL FROM SITE

- .1 At end of each day's work, leave work in a safe and stable condition.
- .2 Stockpiling of demolition debris is permitted on a temporary basis as approved by the Engineer.
- .3 Removal of temporary stockpiled material will be required, if it is deemed by the Engineer, to interfere with operations of Owner.

3.4 SALVAGE AND DISPOSAL OF MATERIALS

- .1 Dispose of items not designated for reuse or relocation off site at authorized facilities. Confirm with the Owner prior to disposal, in case the Owner wishes to retain said items for spare parts.
- .2 Pay all costs and fees associated with the removal from site and disposal.

3.5 ITEMS FOR TURN OVER TO OWNER

- .1 Transport items scheduled for turn over to the Owner's facility.

3.6 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

3.7 CLEANUP

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to complete demolition, salvaging, recycling and removals. The work generally includes, but is not limited to removal of existing building, electrical and mechanical components, structures and concrete where indicated on the Drawings.

1.2 RELATED SECTIONS

- .1 Section 31 23 33 – Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA).
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 Canadian Federal Legislation:
 - .1 Canadian Environmental Protection Act (CEPA), 2023.
 - .2 Canadian Impact Assessment Act (CIAA), 2019.
 - .3 Transportation of Dangerous Goods Act (TDGA), 2019.
 - .4 Motor Vehicle Safety Act (MVSA), 2024.

1.4 EXISTING CONDITIONS

- .1 Items to be demolished and removed are to be based on their condition on date that Tender is accepted.

1.5 STORAGE AND PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures and services. Provide bracing, shoring as required. Repair damage caused by demolition as directed by Owner/Engineer.
- .2 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, cease operations and notify Owner/Engineer.
- .3 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Owner/Engineer and at no cost to Owner/Engineer.

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- .4 Keep noise, dust and inconvenience to occupants to a minimum.
 - .5 Prevent debris from blocking surface drainage, which must remain in operation.
 - .6 Ensure the demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .7 Fires and burning of waste or materials is not permitted on site.
 - .8 Do not bury waste or materials on site.
 - .9 Cover or wet down dry materials and waste to prevent blowing dust and debris.
 - .10 Protect trees, plants and foliage on site and adjacent properties where indicated.
 - .11 Unless specified otherwise, materials for removal become Contractor's property.

1.6 REGULATORY REQUIREMENTS

- .1 Ensure all work is performed in compliance with applicable provincial and municipal regulations.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site with Owner/Engineer and verify extent and location of items designated for removal, disposal, salvage, recycle and items to remain.
- .2 Locate and protect utilities to remain. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 All charges associated with coordinating the work by NB Power or any utility affected by the work shall be included in the Contract Price. Refer to electrical drawings and specifications for clarification of electrical fees for utility service.

3.2 SAFETY CODE

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- .1 Observe construction safety measures of Provincial Government, including but not limited to the Occupational Health and Safety Act and WorkSafe NB, provided that in any case of conflict or discrepancy the more stringent requirement shall apply.
 - .2 Ensure that volatile waste is stored in closed containers and removed from premises daily.
 - .3 WHMIS:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (SHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.
 - .4 At the end of each day's work, leave work in safe and stable condition.

3.3 SEQUENCES OF OPERATION

- .1 Refer to site restrictions in Section 33 32 13 for site specific sequencing and phasing required for construction.
- .2 Removal:
 - .1 Remove items as indicated.
 - .2 Do not disturb items designated to remain in place.
- .3 In removal of pavements:
 - .1 Square up and create keyways adjacent surfaces to remain in place by saw cutting, milling or other method approved by Owner/Engineer.
 - .2 Protect underlying and adjacent granular materials.
 - .3 Remove existing asphalt pavement from prepared cuts as required.
 - .4 Dispose of surplus asphalt offsite.
 - .5 Remove existing gravels under the asphalt pavement and concrete.
- .4 Obtain written approval of Owner prior to any removal of trees.
- .5 Buried services:
 - .1 Disconnect existing services and wiring:
 - .1 Shut off, disconnect and cap mechanical services, underground utilities and conduit. Remove underground utilities where indicated. Coordinate with the appropriate agency for abandoning of existing services.
 - .2 Backfill with select backfill material.
- .6 Backfilling excavations: where removal of concrete or piping is taking place excavations are to be backfilled with aggregate subbase, 75mm minus crushed rock, and compacted to limited identified in Section 31 23 33 - Excavation, Trenching and Backfilling.

3.4 REMOVAL FROM SITE

- .1 At end of each day's work, leave work in a safe and stable condition.

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- .2 Stockpiling of demolition debris shall only be permitted on a temporary basis as approved by the Owner/Engineer.
 - .3 Removal of temporary stockpiled material will be required if it is deemed by the Owner/Engineer to interfere with operations of the Owner.
 - .4 Complete demolition in a manner to minimize dust and hazards. Keep materials wetted as directed by the Owner/Engineer.
 - .5 Pay all costs and fees associated with the removal from site and disposal.
 - .6 The Contractor is advised that they are responsible to coordinate construction and demolition activities. No items are to be removed without first receiving permission by Owner/Engineer. Materials deemed salvageable by Owner/Engineer are to be removed and transported to location within Town boundaries. All debris to be disposed of offsite at an approved location by the Contractor.
 - .7 Burying of rubbish and waste materials is prohibited.

3.5 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

3.6 CLEANUP

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.1 - Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations; 2021.

1.2 GENERAL

- .1 This Section covers items common to Sections of Division 26.

1.3 SCOPE OF WORK

- .1 The Work to be done under this contract consists of furnishing all materials, tools, equipment and labour, and performing the electrical services as indicated and as specified herein and on the Electrical Drawings.
- .2 Supply and install new underground ductbanks and overhead services to Lift Stations No. 1, 2 and 3 as indicated on the drawings and specified herein.
- .3 At Lift Station No. 1, 2 and 3, arrange and coordinate with the local power authority to provide utility power to the new lift station. This includes the supply and installation of new overhead transformers and poles as determined by the utility.
- .4 Supply and install new services with voltage, amperage, phase and wiring as listed below:
 - Lift Station No. 1 - 600/347V, 100A, 3PH, 4W.
 - Lift Station No. 2 - 120/240V, 200A, 1PH, 3W.
 - Lift Station No. 3 - 600/347V, 100A, 3PH, 4W.
- .5 Accept delivery and install Owner pre-selected equipment including Pump station control panel and associated equipment as identified in Section 01 10 00 and in Division 26 herein.
- .6 At the new Lift Stations No. 1, 2 and 3, supply and install flow meters where indicated on the drawings and as specified herein.
- .7 At the new Lift Stations, 1, 2 and 3, supply and install new manual transfer switches as indicated.
- .8 Supply and install required cable glands, conduit, conduit fittings and required mounting hardware.
- .9 Supply and install grounding necessary to meet the requirements of the CEC - Part 1 and the local provincial inspection authority.

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- .10 Document, test and calibrate to satisfaction of the Engineer, electrical, instrumentation and controls equipment as specified herein and on the drawings.
 - .11 Safely store electrical, instrumentation and controls equipment awaiting installation.
 - .12 Protect installed electrical, instrumentation and controls equipment.
 - .13 Repair/replace equipment damaged during construction, or otherwise deemed defective or non-compliant with this specification at no expense to the Contract. These expenses include all material, labour and other fees.
 - .14 Coordinate/schedule with other trades to ensure that the construction proceeds in a timely and efficient manner. Minimize disturbance to existing systems and provide access for plant operator for routine maintenance and inspection.
 - .15 As indicated on the drawings, some areas in and around the lift stations are Zone 1 and Zone 2 hazardous locations as defined by Section 18 of the Canadian Electrical Code. All electrical installations in these areas must be completed in accordance with the Canadian Electrical Code for the specified classification. These areas contain hydrogen sulphide (North American Gas Group C, IEC Gas Group IIB) and methane (North American Gas Group D, IEC Gas Group IIA) gases. Zone 1 and Zone 2 hazardous areas are also a Category 2 location in accordance with Section 22 of the Canadian Electrical Code and the electrical installation to be completed as per the requirements of a Category 2 location. Refer to the electrical design drawings for hazardous locations.

1.4 CODES AND STANDARDS

- .1 Do complete installation in accordance with the Canadian Electrical Code, CSA C22.1, and local regulations except where specified otherwise.
- .2 Comply with all CSA electrical bulletins in force at the time of tender submission. While not identified or specified by reference number in this division, the bulletins shall be considered to form part of the related CSA part II standard.
- .3 Do overhead systems in accordance with CAN/CSA C22.3 No. 1, and underground systems in accordance with CAN/CSA C22.3 No. 7, except where specified otherwise.
- .4 Abbreviations for electrical terms: to CSA Z85.

1.5 CARE, OPERATION AND START-UP

- .1 Instruct operating personnel in the operation, care, and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components, including but not limited to panelboards, digital meters, motor control panels, VFD's, overload relays, motor circuit protectors, transfer switches, instruments, controls.

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- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.6 VOLTAGE RATINGS

- .1 Operating voltages: to CSA C235.
- .2 Motors, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.7 PERMITS, FEES AN INSPECTION

- .1 Submit to the Electrical Inspection Department, Municipal Authority and Supply Authority the necessary number of drawings and specifications for examination and approval prior to commencement of Work. Submit information within thirty (30) working days of the award of trade package and provide the Engineer with written notice at the time this has been submitted.
- .2 Provide the Engineer with a copy of the Electrical Inspection Department and Supply Authority Plans Review Report immediately upon receipt. No shop drawings will be reviewed prior to receipt of the Plans Review Report from the Contractor.
- .3 Obtain all necessary permits including an Electrical Wiring Permit for electrical work from the authority having jurisdiction prior to commencement of Work. Provide a copy of each permit to the Engineer upon receipt. Display permits on the work site.
- .4 Upon specific request, the Engineer will provide to the Contractor, up to a maximum of three (3) copies of the drawings and specifications required for submittal to the Electrical Inspection Department and Supply Authority. These drawings and specifications will be provided to the Trade Contractor at no cost, unless specified otherwise.
- .5 Arrange for all required inspections to be conducted by the authority having jurisdiction. Provide a copy of all inspection reports to the Engineer immediately upon receipt. Notify the Engineer immediately of changes required by the authority having jurisdiction prior to making changes. All changes must be approved by the Engineer.
- .6 Furnish Certificates of Acceptance from authorities having jurisdiction upon completion of Work. Include a copy in the Operations and Maintenance Manual.
- .7 Pay all associated fees.

1.8 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with section 01 10 00.

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- .2 Equipment and material to be CSA certified or certified by an electrical inspection agency approved by the Provincial Electrical Inspection Department.
 - .3 Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval, in writing, from Provincial Electrical Inspection Department.
 - .4 Factory assemble control panels and component assemblies.

1.9 ELECTRIC MOTORS EQUIPMENT AND CONTROLS

- .1 Coordinate supplier and installer responsibility for mechanical and process equipment specified in other specification divisions with the Contractor to confirm complete and functioning systems.
- .2 Confirm location of mechanical and process equipment and associated control devices specified in other divisions. Device locations may not be necessarily shown on the electrical drawings.

1.10 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.
 - .1 Paint indoor distribution enclosures light grey to EEMAC 2Y-1.
- .2 Clean and touch up surfaces of new shop-painted equipment scratched or marred during shipment or installation, to match original paint to the satisfaction of the Engineer. If not acceptable, replace equipment at no additional cost to the Contract.
- .3 Clean and prime exposed non-galvanized hangers, racks, and fastenings to prevent rusting.

1.11 FASTENERS AND EQUIPMENT MOUNTING

- .1 Fastening devices for all equipment and components, including bolts, nuts, washers, and screws shall be galvanized steel throughout except as follows:
 - .1 Use 316 stainless steel hardware outside, in wet and/or corrosive areas, and in electrically hazardous areas.
 - .2 Use of RPVC conduit and hardware is acceptable inside in non-hazardous rated zones.

1.12 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as specified herein.
- .2 Identification:

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- .1 Provide panels, disconnect switches, receptacles, transformers, control panels, etc. with lamicaid nameplates as further described herein. Take care to affix all plates true and level, and plumb in all instances.
 - .2 Affix nameplates to all "metal" surfaces with steel type "pop-rivets".
 - .3 Affix nameplates to other types of surfaces with contact type cement.
 - .4 Affix nameplates to building "exterior" surfaces with nylon inserts and self-tapping screws unless specifically indicated otherwise.
 - .5 Apply contact type cement to complete rear side of plate (battered), as opposed to several locations or areas on same.
 - .6 Lamicaid nameplates installed on distribution panelboards, transformers, and splitters to indicate the following:
 - .1 Designated name of equipment.
 - .2 Amperage of overcurrent protection device.
 - .3 Voltages, number of phases and wires.
 - .4 Designation of power source.
PANEL C 120/208V, 100A, 3PH, 4W FED FROM PANEL B
 - .7 Lamicaid nameplates installed on all various systems controls, control panels, disconnect switches, etc., to contain the following information:
 - .1 Designated name of equipment or equipment being fed, whichever is applicable.
 - .2 Designated name of power source.
 - .3 Branch circuit breaker number(s) where possible.
 - .4 Voltage(s) and phase.
FAN NO. 1:
PANEL H - CKT. 17
120V, 1 PH
FAN NO. 2:
MCC NO. 1
600V, 3 PH
 - .8 Lamicaid nameplates installed on fusible type disconnect switches to also indicate the maximum designated/designed fuse size and type.
 - .9 Install lamicaid nameplates on all junction and pull boxes sized 150 mm x [150] mm and larger indicating name of system, designated panel name and electrical characteristics where applicable.
 - .10 Install lamicaid nameplates adjacent to each overcurrent device located in switchboards, CDP panels, etc. They need only indicate designated name and/or number of equipment they feed. Identify unused O.C. devices as spare(s).
 - .11 Install lamicaid nameplates above all types of receptacles and abutted directly to tops of their respective device plates. Identification to indicate respective panel source complete with associated circuit breaker number(s). Lamicaid plate to be 1.5 mm thick x 13 mm high complete with 6 mm black letters on white core, directly above all flush receptacles. Plate to be identical width as finish device plate and the top left and right corners are to be rounded off.
 - .12 Identify lamicaid nameplates above 120V receptacles protected by GFCI circuit breakers, or GFCI type receptacles as per the following:

- .13 1.5mm thick x 19mm wide complete with 6 mm black letters on white core above all receptacles. Identical width as finish device plate (EXAMPLE: GFCI Protected Panel H-26).
- .14 Allow for an "average" of 40 letters for each lamicoid nameplate.
- .15 Lamicoid to be 3 mm thick plastic engraving sheet, white face, black core, for all electrical systems except fire alarm systems to have red face with white core.
- .16 Lettering on lamicoid nameplates must not "start", nor "end" nearer than [9] mm from either, or both ends of said plates.
- .17 Size of lettering, including overall lengths of various plates must be as indicated in the following chart.

NOMINAL NAMEPLATE SIZES

Size 1	10mm x 50mm	1 line	5mm high letters
Size 2	13mm x 75mm	1 line	6mm high letters
Size 3	16mm x 75mm	2 lines	5mm high letters
Size 4	19mm x 90mm	1 line	10mm high letters
Size 5	50mm x 90mm	2 lines	13mm high letters
Size 6	25mm x 100mm	1 line	13mm high letter
Size 7	25mm x 100mm	2 lines	6mm high letters
Size 8	50mm x 150mm	2 lines	13mm high letters
Size 9	50mm x 100mm	3 lines	10mm high letters

- .3 Have wording on nameplates and labels approved by the Engineer prior to manufacture.
- .4 Identification to be English.
- .5 Supply and install lamicoid nameplates on, or adjacent to, all various systems' control panels and/or cabinets complete with information as indicated. Nameplates to reflect individual system's assigned name, and where applicable, also indicate both designated panel name and associated branch circuit breaker number(s).
- .6 Control Transformers:
 - .1 Concealed control transformers located within ceiling spaces are to have lamicoid nameplates installed adjacent to same indicating their identified system, primary power source including designated panel name, complete with associated branch circuit breaker number(s).
 - .2 Install a second plate with identical information on underside of room grid system or access opening frame directly below control transformer, so as to identify its concealed location directly above same.
 - .3 Identify control transformers installed in either control cabinets or on walls adjacent to same with lamicoid nameplates containing information as previously indicated.
- .7 Co-ordinate names of equipment and systems with other trades to make equipment identification consistent.
- .8 In addition to required nameplates and colour coding, junction boxes to have the panel and circuit numbers of all wiring contained within listed on the coverplate. List to be written using black indelible marker neatly and legible.

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- .9 Colour code electrical junction boxes and pull boxes as follows:
 - .1 Apply colour coding prior to pulling conductors into boxes.
 - .2 Where primary colour only is indicated:
 - .1 Colour inside and outside of box.
 - .2 Colour all cover plates.
 - .3 Where primary and secondary colours are indicated:
 - .1 Paint inside and outside of box with the primary colour.
 - .2 Diagonally apply to each half of the cover plate the primary and secondary colours.
 - .4 Ensure grounding screw in junction boxes is not painted to allow for proper contact and termination.
 - .10 Provide clearly visible marking on electrical equipment to warn persons of potential electrical shock and arc flash hazards as specified in the Canadian Electrical Code.
 - .11 Provide terminal boxes, panels and miscellaneous equipment fed from two or more sources with a warning nameplate prominently displayed: "CAUTION - MORE THAN ONE SOURCE VOLTAGE".
 - .12 Provide terminal boxes, panels and miscellaneous wire ways containing intrinsically safe circuits with a warning nameplate prominently displayed: "INTRINSICALLY SAFE CIRCUIT".

1.13 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring. Install labels in a "flagged" manner around individual conductors.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.
- .5 Indicate panel and circuit number on all phase conductors (i.e., Panel A, ckt 3) at the device and at any intermediate junction/pull boxes.
- .6 Identify all neutral conductors to indicate the phase conductor with which they are associated and at any intermediate junction/pull boxes.

1.14 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and cables to match existing electrical systems.
- .2 Install coloured plastic tape or paint at points where conduit or cable enters wall, ceiling or floor, and at 15 meter intervals.

- .3 Colours: 25 mm wide prime colour and 19 mm wide auxiliary colour.

System	Prime	Auxiliary
Up to 250v	Yellow	
Up to 600V	Yellow	Green
Telephone	Blue	Grey

Other Communication		
Systems	Green	Blue
Security	Blue	
Building HVAC Controls (<50V)	Orange	
PLC I/O Digital	White	Grey
PLC I/O Analog	White	Blue

- .4 For power cables to electrical equipment, indicate designated name of equipment and designated name of power source (i.e., Fuel Pump #1 - fed from MCC #1).
- .5 Where more than one cable terminates at a device, add cable number (i.e., -1, -2) to end of cable identification.
- .6 Use Electrovert PVC K-marking sleeves (black on yellow), complete with PVC carrier strip and self-locking nylon cable ties (black) or approved equivalent.

1.15 MANUFACTURERS AND CSA LABELS

- .1 Visible and legible after equipment is installed.

1.16 WARNING SIGNS

- .1 As specified and to meet requirements of Electrical Inspection Department.
- .2 Treated polyethylene plastic or coated rust free aluminum signs, minimum size 180mm x 250mm.

1.17 LOCATION OF EQUIPMENT

- .1 Locate outlets in accordance with the Drawings and these Specifications.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of equipment at no extra cost or credit, providing distance does not exceed 3 meter and information is given before installation.
- .4 Locate light switches on latch side of doors.

1.18 MOUNTING HEIGHT

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1350mm AFF.
 - .2 Wall receptacles:
 - .1 General: 450mm AFF.
 - .2 Elevated mounting in process areas: 1200mm AFF.
 - .3 Outdoors: 1200mm above finished grade.
 - .4 Thermostats: 1500mm AFF.
 - .5 Panelboards: as required by Code or as indicated.

1.19 LOAD BALANCE

- .1 Measure phase current to panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Submit, at completion of Work, report listing phase and neutral currents on panelboards and transformers operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.20 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Arrange and pay for holes through exterior walls; provide flashings and make weatherproof.
- .4 Install conduits to be embedded or plastered over, neatly and close to the building structure so furring can be kept to a minimum.

1.21 FIELD QUALITY CONTROL

- .1 Conduct and pay for following tests:

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- .1 Power distribution system including phase rotation, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .4 Manual transfer switch.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
 - .3 Insulation resistance testing:
 - .1 Megger circuits, feeders and distribution equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and distribution equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
 - .4 Provide a type written tabular report indicating test results.
 - .4 Provide a type written tabular report indicating the normal field measured load current for all motors, indicating the motor circuit protector trip setting or fuse type/rating, the overload heater element sizes and/or settings. Indicate the motor nameplate current.
 - .5 Provide "as-commissioned" settings for VFD's.
 - .6 Advise the Engineer of dates when testing will take place. Provide five (5) days notice of such tests.
 - .7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
 - .8 Submit test results for the Engineer's review and approval.

1.22 COORDINATION OF PROTECTIVE DEVICES

- .1 Confirm circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings as per Protection Coordination and ArcFlash study to be supplied by the Contractor. Submit the Protection Coordination and ArchFlash study to the Owner and Engineer for review and approval prior to application and testing of protective overcurrent devices.
- .2 Include recommended overcurrent settings for all adjustable circuit breaker trip units, motor circuit protector trip units, motor overloads and power distribution fuses in the study.
- .3 Include Arc flash labels for each piece of electrical distribution equipment and control panels.

1.23 QUALITY ASSURANCE

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- .1 Instructions:
 - .1 Interferences: electrical drawings are generally of a diagrammatic nature. Plan and coordinate the Work to eliminate interferences with other trades. Provide all necessary raceway offsets, fittings, and boxes, adjust all fixture and equipment boxes, adjust all fixture and equipment locations and provide all supporting materials required for a planned, coordinated and neat installation. Where interferences occur, the Engineer will decide which item must be relocated regardless of which was installed first.
 - .2 Electrical workmanship: provide workmanship of the highest quality. Sub-standard Work will not be accepted. Use only persons skilled in the trades involved.
 - .3 Electrical materials: provide all materials used in this Work, unless particularly specified otherwise, that are new, free from flaws, or imperfections.
 - .4 Sleeves and inserts: furnish and locate all sleeves and inserts required for this work in accordance with drawings.
 - .2 Applicable standards:
 - .1 All electrical work must conform with the requirements and recommendations of the latest edition of the Canadian Electrical Code and all local codes and ordinances. In conflicts between codes, the more stringent requirements shall govern.
 - .2 In no instance will the standard established by this specification be reduced by any of the codes or standards referred to in this specification.
 - .3 Standards: the specifications and standards of the following organizations are by reference made as part of these specifications and all electrical Work, unless otherwise indicated, to comply with their requirements and recommendations wherever applicable.
 - .4 Canadian Standard Association (CSA).
 - .5 Institute of Electrical and Electronics Engineers (I.E.E.E.).
 - .6 Instrument Society of America (I.S.A.).
 - .7 American Society for Testing Materials (A.S.T.M.).
 - .8 Insulated Power Cable Engineers Association (I.P.C.E.A.).
 - .9 National Electrical Manufacturers' Association (N.E.M.A.).
 - .10 National Fire Protection Association (N.F.P.A.).
 - .11 Underwriter's Laboratories of Canada (U.L.C.).
 - .12 Joint Industrial Council (J.I.C.).

1.24 PROCESS/ MECHANICAL EQUIPMENT PACKAGES

- .1 Coordinate electrical work with the process and mechanical system vendors.
- .2 Connection details and requirements for interwiring between vendor supplied process and mechanical equipment packages specified under other Divisions and Owner-supplied equipment are the requirement of the Contractor.
- .3 Refer to manufacturer's shop drawings for connection details and recommended installation details.

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- .4 Provide all cable, conduit, cable channel/trough, supports and miscellaneous hardware as per the requirements of this specification.

1.25 RECORD DRAWINGS

- .1 Record Drawings:
- .1 After award of Contract, Engineer will provide a set of full-sized drawings for purpose of maintaining record drawings. Accurately and neatly record deviations from Contract Documents caused by site conditions and changes ordered by the Engineer.
 - .2 Identify drawings as "Project Record Copy". Maintain in new condition and make available for inspection on site by the Engineer.
 - .3 On completion of Work and prior to final inspection, submit record documents to the Engineer.

1.26 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all debris and waste materials at appropriate disposal/recycling facilities.
- .2 Separate and recycle waste materials in accordance with applicable Construction/Demolition Waste Management and Disposal Regulations.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.2 - Test Method for Electrical Wires and Cables; No. 03-09 (R2023).
- .2 CSA C22.2, No. 197-M1983(R2018), PVC Insulating Tape

PART 2 - PRODUCTS

2.1 WIRE AND BOX CONNECTORS

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.
- .2 Tin-plated copper, colour keyed, crimp type compression connectors, (long barrel, two hole) with a straight, 45° or 90° lug tongue configuration as required.
 - .1 Acceptable products: Thomas & Betts "Colour-keyed" compression connectors or approved equivalent.
- .3 Clamps or connectors for armoured cable, liquid tight, flexible conduit, as required.
- .4 Wire connectors to be rated for operating voltage indicated.

2.2 ELECTRICAL TAPE

- .1 Vinyl Electrical Tape:
 - .1 Minimum 0.178mm thick, vinyl insulating tape per CSA standard C22.2 No. 197
 - .2 Temperature rating up to 105°C continuous.
 - .3 Tape to be conformable for cold weather application down to -18°C
 - .4 Pressure sensitive rubber based adhesive.
 - .5 Suitable for wet and dry locations.
 - .6 Rated for 600V circuits and below.
 - .7 Flame retardant and UV resistant.
 - .8 Colour: Black.
 - .9 Acceptable Materials: 3M Scotch 33+ or approved equivalent.
- .2 Rubber Insulating Tape:
 - .1 Highly conformable, ethylene propylene rubber (EPR), high voltage insulating and sealing tape (self bonding).
 - .2 Temperature rating up to 90°C continuous and 130°C short term overload service.
 - .3 Suitable for wet and dry locations.

-
- .4 Rated for 600V circuits and below.
 - .5 Flame retardant.
 - .6 Colour: Black.
 - .7 Acceptable Manufacturers: 3M Scotch, or approved equivalent.

PART 3 - EXECUTION

3.1 WIRE AND BOX CONNECTORS INSTALLATION

- .1 Make connections and terminations electrically and mechanically secure. Sizes of connectors to be per manufacturer's recommendations for various sizes and combinations of wire sizes.
- .2 Make joints required in lighting and receptacle branch wiring #8 and smaller utilizing "twist-on" type connectors as manufactured by "Ideal" (colour coded wirenut) or "Marrettes" #31, #33 or #35, or approved equivalents.
- .3 Make lighting and receptacle branch wiring joints larger than #8 AWG utilizing colour keyed crimp type compression connectors (two hole, long barrel, tin-plated copper) complete with manufacturer approved compression tools. Compression connectors to be bolted together and torqued in accordance with manufacturer's recommendation. Install first layers of rubber insulating tape followed by additional layers of vinyl electrical tape in accordance with the manufacturer's instructions. Heat shrink can also be used.
- .4 Plier tighten "twist-on" type connectors.
- .5 For connections to equipment not provided with lugs, install colour keyed, crimp type compression connectors (long barrel, two hole, tin-plated copper, straight lug tongue) complete with manufacturer approved compression tools. Alternate lug tongue configurations (45° and 90°) will be accepted where required by application.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.1 - Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations; 2021.
- .2 CSA C22.2 No. 208 - Fire Alarm and Signal Cable; 2018 (Reaffirmed 2023).

1.2 SUBMITTALS

- .1 Submit shop drawings, and product data in accordance with Section 01 10 00.

1.3 RELATED SECTIONS

- .1 Conduits, Conduit Fastenings and Conduit Fittings: Section 26 05 34
- .2 Wire and Box Connectors (0 - 1000V): Section 26 05 20
- .3 Instrumentation: Section 26 90 00

PART 2 - PRODUCTS

2.1 BUILDING WIRES

- .1 Conductors: soft drawn, stranded, copper (of 98% conductivity). Minimum size #12 AWG.
- .2 Copper conductors: size as indicated, with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90-XLPE.
- .3 Copper conductors: size as indicated, with 1000V insulation of chemically cross-linked thermosetting polyethylene material rated RWU90-XLPE.
- .4 Colour code wiring in accordance with the Canadian electrical Code.
- .5 SOW type flexible copper conductor may be utilized for drops from a junction box to a suspended luminaire in non-hazardous process areas.

2.2 TECK 90 CABLE

- .1 Provide TECK cable in accordance with Section 26 05 00.
- .2 Conductors:
 - .1 Grounding conductor: stranded copper.

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- .2 Circuit conductors: stranded copper, size and quantity as indicated.
 - .3 Insulation:
 - .1 Chemically cross-linked thermosetting polyethylene rated type RW90, 1000V.
 - .4 Inner jacket: polyvinyl chloride material.
 - .5 Armour: interlocking aluminum.
 - .6 Overall covering: Polyvinyl chloride (PVC), heat, flame and moisture resistant material, FT4 rated, UV resistant, black colour.
 - .7 Connectors:
 - .1 Non Hazardous Areas: Die cast aluminum connectors suitable for TECK 90 cables and complete with aluminum locknut.
 - .2 Zone 1 and Zone 2 Hazardous Areas: Die cast aluminum connectors suitable for TECK 90 cables and complete with sealing compound and aluminum locknut.
 - .8 TECK 90 cables must be suitable for installation in the hazardous area classification indicated.

2.3 **CONTROL CABLES**

- .1 Type LVT: two (2) soft annealed solid copper conductors, #18AWG with PVC insulation, outer covering of thermoplastic jacket (brown colour), rated 300V.
- .2 24 Vdc control cable: stranded annealed tinned copper multi-conductors, minimum #16AWG size, quantity as indicated.
 - .1 Insulation: XLPE insulation.
 - .2 Shielding: foil tape shield over conductors.
 - .3 Armour: interlocking aluminum where required or as indicated.
 - .4 Overall covering: PVC jacket (moisture resistant and fire retardant), grey colour, FT4 rated, UV resistant.
 - .5 Voltage rating: 300V or 600V to suit application or as indicated.
 - .6 CSA type CIC (unarmoured) or ACIC (armoured).
- .3 120Vac control cables:
 - .1 Unarmoured conductors:
 - .1 Conductors: stranded copper, minimum size #14AWG, type RW90.
 - .2 Voltage rating: 600V.
 - .2 Armoured cables (TECK 90):
 - .1 Conductors:
 - .1 Grounding conductor: stranded copper
 - .2 Circuit conductors: stranded copper, minimum size #14AWG.
 - .2 Insulation: RW90-XLPE, 600V.
 - .3 Inner jacket: polyvinyl chloride (PVC) material.
 - .4 Armour: interlocking aluminum.

-
- .5 Overall jacket: polyvinyl chloride (PVC), heat, flame and moisture resistant material, FT4 rated, UV resistant, black colour.

2.4 PROCESS CONTROL AND INSTRUMENTATION

- .1 Refer to Sections 26 90 00 and electrical drawings

PART 3 - EXECUTION

3.1 INSTALLATION OF CABLES: GENERAL

- .1 Support cables independently of supports used for equipment of other trades; do not support from or secure cables to ductwork and piping.
- .2 Install cables in a neat and professional manner, so as to conserve headroom.
- .3 Install cables parallel and perpendicular to building lines.
- .4 In wet/damp areas and outdoors, cables to enter into the bottom of the equipment.
- .5 Twist together stranded conductors at each termination.
- .6 Ty-wrap branch circuit phase conductors and neutral (where applicable) at the closest point of entry within all panelboards, pullboxes, junction boxes, motor control centres and switchboards.
- .7 Conductor length for parallel feeders to be identical.
- .8 Wiring in walls: drop or loop vertically from the ceiling above. Avoid running wiring horizontally in walls.
- .9 Terminate conductors/cables.
- .10 Do not lay cables on top of suspended ceiling grids and tiles.

3.2 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows: in conduit systems in accordance with Section 26 05 34.

3.3 INSTALLATION OF CONTROL CABLE

- .1 Install unarmoured cables as follows: in conduit systems in accordance with Section 26 05 34.
- .2 Install armoured cables only where indicated on the drawings.
- .3 Group cables wherever possible on surface mounted channels.

-
- .4 Terminate cables and provide connectors as required.
 - .5 Install in accordance with clause 3.1 - Installation of Cables: General.
 - .6 On walls, secure armoured cables to surface mounted u-shaped supports.

3.4 INSTALLATION OF TECK 90

- .1 Install cables where indicated on the drawings.
- .2 Group cables wherever possible on surface mounted channels.
- .3 Terminate cables and provide connectors as required.
- .4 Install in accordance with clause 3.1 - Installation of Cables: General.
- .5 On walls, secure armoured cables to surface mounted u-shaped supports.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Electrical General Requirements: Section 26 05 00

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Clamps for grounding of conductor, size as required to grounding electrodes.
- .2 Direct buried grounding conductors: bare stranded copper of minimum 98% conductivity, un-tinned, soft annealed, size as indicated.
- .3 Insulated grounding and bonding conductors: soft-drawn, stranded copper of minimum 98% conductivity, un-tinned, type RW90 (green coloured insulation). Conductors to be FT4 rated when installed in free-air.
- .4 Make ground connections on the ground bus as follows:
 - .1 For wire sizes 6 AWG and smaller: copper, one-hole, short barrel (single crimp) lugs.
 - .2 Wire larger than 6 AWG to be two-hole, long barrel (dual crimp) lugs.
- .5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.
- .6 Copper crimp type compression connectors, (long barrel, two hole).
- .7 Copper crimp type compression connectors (cable to cable, cable to ground rod, etc.)
- .8 Rod electrodes, copper clad steel, 21mm diameter, 3m long.

2.2 MANUFACTURERS

- .1 Acceptable manufacturers: FCI - Burndy Corporation, Erico Inc., Thomas & Betts, IlSCO.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, conductors, connectors, accessories, as indicated, to conform to requirements of the Engineer, and local authority having jurisdiction over installation.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections and connections to electrodes using exothermic welding process or inspectable copper crimp type compression connectors.
- .5 Use mechanical connectors for grounding connections to equipment provided with grounding lugs.
- .6 Soldered joints not permitted.
- .7 Make grounding connections in radial configurations only, with connections terminating at single grounding point. Avoid loop connections.
- .8 Provide insulated copper bonding conductor in all conduit runs. Minimum size #14AWG or as indicated in Table 16 of the CEC, whichever is larger.
- .9 Use copper, crimp type compression connectors for grounding connections to equipment not provided with connectors.
- .10 Secure the 'feed' bonding conductor (wrapped around unbroken) to the grounding screw of each outlet/device box, before connecting to the other grounding conductors and/or providing a "pig-tail" lead for device terminations.
- .11 Twist all ground/bond wires together with a screw-on type wire connector, and then placed in the rear of the outlet box.

3.2 ELECTRODES

- .1 Bond separate, multiple electrodes together.
- .2 Use copper conductors, size as indicated, for connections to electrodes.
- .3 Install grounding triad near the service entrance and connect to electrical grounding system with copper conductor, size as indicated.

3.3 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of secondary systems.

3.4 EQUIPMENT GROUNDING & BONDING

- .1 Install grounding and bonding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, cable trays, transformers, frames of motors, Motor Control Centres, motor starters, control panels, distribution panels, outdoor lighting, process equipment, generator frames, instrumentation, building steel work and air ducts.
- .2 Install #10AWG bonding jumper across sections of air ducts.
- .3 Perform tests in accordance with Section 26 05 00.
- .4 Perform tests before energizing electrical system.

END OF SECTION

PART 1 - GENERAL

1.1 NOT USED

PART 2 - PRODUCT

2.1 SUPPORT CHANNELS

- .1 U shape, size 41 mm x 41 mm, 2.7 mm thick, surface mounted, suspended or set in poured concrete walls and ceilings unless otherwise indicated.
- .2 Standard rolled structural steel shapes and plates or prefabricated structural systems.
- .3 Materials:
 - .1 Hot-dipped galvanized steel (after fabrication) unless otherwise noted.
 - .2 Electrogalvanized steel in dry non-process areas.
 - .3 316 Stainless steel outside, in wet and/or corrosive areas, and in electrically hazardous areas.
 - .4 Rigid PVC in building in non-hazardous rated area.

2.2 CABLE TIES

- .1 Nylon flame retardant, low smoke cable tie, size as required.
- .2 Nylon flame retardant, low smoke cable tie mounting bracket. Mechanical fastening type only; adhesive mounts not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls with stainless steel toggle bolts.
- .4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .5 Fasten exposed conduit or cables to building construction or support system using straps.

-
- .1 One-hole straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole straps for conduits and cables larger than 50 mm.
 - .3 Conduit straps to match conduits in material and finish. Cable straps shall be galvanized steel or stainless steel to suit area.
 - .4 Use heavy duty pipe clamps (with adjustable saddles) to secure conduits/cables to support channels.
- .6 Suspended support systems for horizontal runs:
- .1 Support individual conduit runs with minimum 9 mm dia. continuously threaded rods and spring clips.
 - .2 Support two (2) or more conduits on channels supported by minimum 12 mm dia threaded rod hangers where direct fastening to building construction is impractical.
 - .3 Continuously threaded rods to be zinc plated steel or stainless steel to match supporting hardware.
- .7 For surface mounting of two (2) or more conduits and cable, use support channels spaced in accordance with the Canadian Electrical Code (maximum 1.5m spacing).
- .8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .9 Provide adequate support for conduits and cables dropped vertically to equipment where there is no wall support.
- .10 Do not use wire lashing or perforated strap to support or secure conduits or cables.
- .11 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of the Engineer.
- .12 Provide fastenings and supports as required for each type of equipment, cables and conduits, and in accordance with manufacturer's installation recommendations.
- .13 Provide hot dipped galvanized or stainless steel beam clamps to secure conduits and cable tray to exposed steel work. Use stainless steel clamps in hazardous areas and in wet/corrosive areas.
- .14 Support various suspended types of junction, pull and/or outlet boxes as well as conduits, with minimum size 9 mm threaded rod, nuts and flat washers. Secure threaded rods to boxes with one (1) flat washer and nut installed on both sides of box. Provide:
- .1 One (1) rod required for all type boxes sized 150 mm x 150 mm and smaller.
 - .2 Two (2) rods required for boxes sized 200 mm x 200 mm and larger, up to and including those sized 300 mm x 300 mm.
 - .3 Minimum of four (4) rods required for all boxes sized larger than 300 mm x 300 mm.
 - .4 Cut off all excess rod within 12 mm of channel bottom.
- .15 In addition to C.E.C. minimum conduit spacing requirements, suspended conduit runs containing horizontal or vertical elbows are to have one additional support rod installed not greater than 300 mm and mid point of "all" 90° bends. Maximum spacings between

conduit support channels will be as dictated by smallest size conduit(s) being supported and/or secured to same.

- .16 Where galvanized steel supports are exposed to moisture, touch-up all field cut surfaces with galvanizing paint.
- .17 Install isolator pads between dis-similar metals as required.
- .18 Coordinate support system locations with other trades before installing.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS

- .1 Submit shop drawings, and product data in accordance with Section 01 10 00.

PART 2 - PRODUCTS

2.1 CABINETS

- .1 In non-hazardous locations, provide cabinets constructed of code-gauge sheet steel, each with a hinged and gasketed door, for surface, floor, or flush mounting as indicated on the Drawings. Use NEMA Type 4X stainless steel enclosures in damp and wet process and non-process areas. Use NEMA 4X stainless steel enclosures outdoors. Use primed and grey baked-on enamel NEMA Type 1 steel enclosures in dry indoor non-process areas; and use primed and grey-baked on enamel NEMA Type 12 steel enclosures in dry indoor process areas. Provide cabinets with no knockouts; cut holes for conduit entrances after cabinet is mounted in final position.
- .2 In hazardous locations, cabinets must be suitable for installation in the specified hazardous classification. Cabinet materials must be copper-free aluminum or stainless steel (316).
- .3 Provide all cabinets with continuously hinged doors, padlocking attachment, door stop kit and door handle.

2.2 JUNCTION AND PULL BOXES

- .1 General: Provide outlet, tap, junction, pull and floor boxes with screw-fastened covers. Provide junction and pull boxes longer than 500mm (20") in any dimension complete with continuously hinged cover.
- .2 Tap, Junction and Pull Boxes: Provide boxes constructed of welded and galvanized sheet steel, of sizes required by Canadian Electrical Code. Use 14 USS gauge metal on boxes with no dimension of 600 mm or more, except use 10-gauge boxes with any dimension of 900 mm or more.
- .3 Use NEMA Type 1 enclosures (steel) in dry.

PART 3 - EXECUTION

3.1 CABINETS, JUNCTION AND PULL BOXES

-
- .1 Only main junction and pull boxes are indicated on the drawings. Provide boxes to suit field conditions and where required by the Canadian Electrical Code.
 - .2 Install junction and pull boxes in inconspicuous but accessible locations.
 - .3 Mount cabinets with top not higher than 2m above finished floor.
 - .4 Provide all required mounting hardware.
 - .5 Junction or outlet boxes feeding a maximum of two fixture drops must not be sized smaller than 100mm square.
 - .6 Concealed boxes located in the ceiling spaces above suspended type ceilings are not to be installed greater than 762mm above the finished ceiling elevation.
 - .7 Junction boxes larger than 150mm x 150mm used in branch circuit wiring are to be complete with bonding terminal stripes.
 - .8 Bond all pull boxes with bonding conductor.

3.2 SPLITTER BOX

- .1 Install solitters and mount plumb, true and square to building lines.

3.3 IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.1 - Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations; 2021.

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES

- .1 General:
 - .1 Size boxes in accordance with CSA C22.1.
 - .2 10 mm square or larger outlet boxes as required for special devices.
 - .3 Gang boxes where wiring devices are grouped.
 - .4 Blank cover plates for boxes without wiring devices.
 - .5 Combination boxes with barriers where outlets for more than one system are grouped.
- .2 Sheet steel outlet boxes:
 - .1 Electro-galvanized steel single and multi-gang flush device boxes for flush installation, minimum size 75 x 50 x 38 mm or as indicated. Use [100] mm square outlet boxes when more than one conduit enters one side.
 - .2 100 mm square or octagonal outlet boxes for lighting fixture outlets.
 - .3 Electro-galvanized steel utility boxes for outlets connected to surface mounted EMT, minimum size 100mm x 54mm x 47mm.
- .3 Masonry boxes: electro-galvanized steel masonry single and multi-gang boxes for devices flush mounted in exposed block walls.
- .4 Concrete boxes: electro-galvanized steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.
- .5 Surface mounted outlet boxes:
 - .1 Cast FS or FD copper free aluminum or feralloy boxes (to match conduit material) with factory threaded hubs and mounting feet for surface wiring of switches, receptacles, thermostats, etc.
 - .2 NEMA 4X PVC outlet boxes in areas where PVC conduit is to be used.
- .6 Explosion proof outlet boxes:
 - .1 Surface mounted, single gang, cast copper free aluminum or iron alloy (galvanized) to match conduit material, outlet box with factory threaded hubs, rated for installation in the hazardous area classification as noted on the drawings.

-
- .2 Confirm outlet box and devices are compatible and that the required hazardous rating is maintained.

2.2 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of foreign materials.
- .3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
- .5 Watertight bushings and cable connectors for all cable/conduit terminations in NEMA 3R/4/4X pull/junction boxes, control panels and cabinets.
- .6 Sealing rings for conduit connections in wet and damp areas.

PART 3 - EXECUTION

3.1 OUTLET BOX, AND CONDUIT BOX INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material. Remove upon completion of Work.
- .3 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers not allowed.
- .4 Install flush mounted boxes in all finished areas unless otherwise indicated.
- .5 Install surface mounted boxes in service rooms and above ceilings unless otherwise indicated.
- .6 Install flush mounted boxes outside in exterior walls unless otherwise indicated.
- .7 Use type FS and FD boxes for surface mounted devices (regardless of system type involved).
- .8 In metal drywall partitions, install a short piece of metal stud (same width as wall) on non-supported side of box and secure to box.
- .9 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .10 For flush installations, mount outlet box flush with finished wall using plaster rings to permit wall finish to come within 6mm of opening.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.2 - Test Method for Electrical Wires and Cables; No. 03-09 (R2023).
- .2 CSA C22.2 No. 18.4 - Hardware for the Support of Conduit, Tubing, and Cable; 2015 (Reaffirmed 2019).
- .3 CSA C22.2 No. 45.1 - Electrical Rigid Metal Conduit - Steel (Trinational Standard with UL 6 and NMX-J-534-ANCE-2022); 2022.
- .4 CSA C22.2 No. 56 - Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit; 2026.
- .5 CSA C22.2 No. 83 - Electrical Metallic Tubing; 1985M (Reaffirmed 2022).
- .6 CSA C22.2 No. 211.2 - Rigid PVC (Unplasticized) Conduit; 2026.

1.2 LOCATION OF CONDUIT

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

1.3 RELATED WORK

- .1 Fastenings and Supports: Section 26 05 29
- .2 Outlet Boxes, Conduit Boxes and Fittings: Section 26 05 32

PART 2 - PRODUCTS

2.1 CONDUITS

- .1 Rigid galvanized steel threaded conduit, fittings and connectors: to CSA C22.2 No. 45.1.
- .2 Rigid aluminum threaded conduit, fittings, and connectors: to CSA C22.2 No. 45.2.
- .3 Electrical metallic tubing (EMT) with steel set screw couplings: to CSA C22.2 No. 83.
- .4 Rigid PVC conduit, fittings, and connectors: to CSA C22.2 No. 211.2.
- .5 Flexible aluminum conduit and liquid-tight flexible metal conduit: to CSA C22.2 No. 56.
- .6 Minimum power and control/instrumentation conduit size for all areas: 21mm.

-
- .7 Rigid PVC conduit to be FT4 rated.

2.2 CONDUIT FASTENINGS

- .1 One (1) hole conduit straps to secure surface conduits 50 mm and smaller. Two (2) hole conduit straps for conduits larger than 50 mm.
- .2 Heavy duty pipe clamps (with adjustable saddle) to secure conduits to support channels.
- .3 Refer to Section 26 05 29 for suspended and surface support systems for conduits.
- .4 Finish and material to match conduit.
- .5 Provide isolators between dis-similar metals as required.

2.3 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90° bends are required for 27mm and larger conduits.
- .3 Connectors and couplings for EMT: steel set-screws in non-dusty areas and rain tight fittings in dusty areas.
- .4 Cast type EYS and EYD seal fittings with factory threaded hubs and rated for the hazardous classification. Acceptable manufacturers: Appleton, Crouse-Hinds, Killark or approved equivalent.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for linear expansion as required.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to building as required.
- .4 Provide expansion fittings at exit point (above-ground) of all underground services, and where indicated on the drawings.
- .5 Where rigid PVC conduit is installed above ground, provide expansion fittings spaced in accordance with manufacturer's instructions and the Canadian Electrical Code.

2.5 FISH CORD

- .1 Polypropylene.

PART 3 - EXECUTION

3.1 CONDUIT INSTALLATION

- .1 General:
 - .1 Use threaded rigid aluminum conduit unless otherwise indicated.
 - .2 Use electrical metallic tubing (EMT) in dry non-process areas and where not subjected to damage. Do not use EMT in cast concrete. Convert EMT to rigid galvanized steel conduit below 2.4m where EMT is surface mounted and subjected to mechanical damage.
 - .3 Use rigid PVC conduit for all direct buried underground services: minimum size 27mm diameter.
 - .4 Use rigid PVC conduit in slab and under slab. Conduit stub ups to be rigid aluminum conduit, with heat shrink sleeve. Leave no portion of aluminum conduit exposed to concrete. ENT is not permitted.
 - .5 Use liquid-tight flexible metal conduit for connection to vibrating equipment (motors, valves, transformers, motorized dampers, etc.) and instruments in non-hazardous areas.
 - .6 Use flexible couplings (explosion-proof, watertight, Appleton Type EXGJH or EXLK or approved equivalent) for vibrating equipment (motors, valves, etc.) and instruments located in hazardous areas.
 - .7 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
 - .8 Conceal conduits except in mechanical rooms, electrical rooms and in process areas.
 - .9 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
 - .10 Mechanically bend steel conduit over 21 mm dia.
 - .11 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
 - .12 Install polypropylene fish cord in all empty conduits. Cap and seal at each end.
 - .13 Where conduits become blocked, remove, and replace blocked section. Do not use liquids to clean out conduits.
 - .14 Dry conduits out before installing wire.
 - .15 Provide minimum 300 mm spacing between instrumentation/control conduits and 600V power conduits. Where possible, instrumentation/control conduits to cross at right angles to 600V power conduits.
 - .16 Seal around all conduit penetrations into chemical rooms with non-shrink grout. Seal conduits penetrating into these rooms using duxseal.
 - .17 Install conduit sealing fittings in hazardous areas in accordance with Canadian Electrical Code requirements. Fill with compound. Seal conduit leaving a hazardous area using an approved sealing fitting at exit point.
 - .18 Drawings do not show all required unions. Unions to facilitate removal of equipment. Where seals are installed, install the unions between the equipment and the seal.

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- .19 Install conduits to prevent low pockets where moisture can accumulate. Install a combination breather and drain fitting at the lowest point of each above-grade conduit system, which is unbroken by sealing fittings or other obstructions.
 - .20 Conduit installed in hazardous rated areas must be threaded, rigid metal conduit as per csa c22.1 section 18 and as indicated on the drawings.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Direct Buried Underground Conduits: Section 33 65 76

PART 2 - PRODUCTS

2.1 CABLE PROTECTION

- .1 Protection materials and methods as indicated on drawings.

PART 3 - EXECUTION

3.1 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with conductors and cable jackets to reduce pulling tension.
- .5 To facilitate matching of colour coded multi-conductor control cables reel off in same direction during installation.
- .6 Underground splices are not permitted.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits, and grounds.
- .5 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

PART 1 - GENERAL

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 00.

1.2 OPERATIONS & MAINTENANCE DATA

- .1 Provide operations and maintenance data for transformers for incorporation into manual.

PART 2 - PRODUCTS

2.1 TRANSFORMERS

- .1 Use the transformers of one (1) manufacturer throughout the project.
- .2 Design 1:
 - .1 Type: dry.
 - .2 Single phase, kVA as indicated, 600 V input, 120/240V output, 60 Hz.
 - .3 Voltage taps: 5%, 2 FCBN (95%, 90%,).
 - .4 Insulation: Class 185°C, 115°C temperature rise.
 - .5 Basic Impulse Level (BIL): standard.
 - .6 Hipot: standard.
 - .7 Average sound level: standard.
 - .8 Impedance at 170°C: standard.
 - .9 Enclosure: NEMA Type 3R.
 - .10 Mounting: wall.
 - .11 Finish: in accordance with Section 26 05 00.
 - .12 Winding configuration: single phase, copper windings.
 - .13 Acceptable material:
 - .1 Hammond Power
 - .2 Schneider Electric
 - .3 Delta Transformers
 - .4 Rex Manufacturing

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00.
- .2 Label size: 9.

Negotkuk First Nation
Wastewater Lift Stations
Renewal Project
AFNWA Project No. F-24-NQ-07

Dry Type Transformers Up To
600V Primary

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END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA C22.2 No.29-15(R2024), Panelboards and Enclosed Panelboards.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Division 3 - Particular Specifications.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for panelboards and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in New Brunswick, Canada.
 - .2 Include on drawings:
 - .1 Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with General Specifications.
- .2 Operation and Maintenance Data: submit operation and maintenance data for panelboards for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Division 3 - Particular Specifications and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect panelboards from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 PANELBOARDS

- .1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.
 - .1 Install circuit breakers in panelboards before shipment.
 - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 250 V panelboards: bus and breakers rated as indicated.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Minimum of 2 flush locks for each panel board.
- .6 Two keys for each panelboard and key panelboards alike.
- .7 Copper bus with neutral of same ampere rating of mains.
- .8 Mains: suitable for bolt-on breakers.
- .9 Trim with concealed front bolts and hinges.
- .10 Trim and door finish: baked enamel as per colour schedule.
- .11 Isolated ground bus.
- .12 Include grounding busbar with 3 of terminals for bonding conductor equal to breaker capacity of the panel board.

2.2 BREAKERS

- .1 Breakers: Compatible with pre-selected equipment, sized as indicated on drawings. As per Section 26 28 21.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Nameplate for each panelboard size 4 engraved as indicated.

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- .3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.
 - .4 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for panelboards installation in accordance with manufacturer's written instructions.
 - .1 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Owner and Consultant.

3.2 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.
- .3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by panelboards installation.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS

- .1 Submit shop drawings, and product data in accordance with Section 01 10 00.

PART 2 - PRODUCTS

2.1 SWITCHES

- .1 Design S1:
 - .1 Heavy duty, specification Grade, 20 A, 120 V, single pole, three-way, four-way switches as indicated, with the following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine molding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 White, heavy duty toggle.
 - .6 Integral ground terminal.
 - .7 Acceptable materials: Hubbell #HBL1221I (single pole); Hubbell #HBL1223I (3-way), or approved equivalent.
 - .2 Toggle operated fully rated for lamps, and up to 80% of rated capacity of motor loads.
 - .3 Provide the switches of one (1) manufacturer throughout project.
 - .4 Approved manufacturers: Eaton Wiring Devices, Leviton, Hubbell, Pass & Seymour.
 - .5 Heavy duty 20A, 120V, single pole, toggle switch with the following features:
 - .1 Rated for the hazardous classification as noted on the drawings.
 - .2 Factory sealed switching mechanism.
 - .3 Aluminum operator mechanism and nylon cam.
 - .4 Copper free, cast aluminum body with threaded hubs, 316 stainless steel hardware and aluminum alloy cover.
 - .5 Suitable for wet/damp/corrosive locations.
 - .6 Acceptable manufacturers:
 - .1 Crouse-Hinds
 - .2 Appleton
 - .3 Killark
 - .6 Non-hazardous rated switches of one (1) manufacturer throughout project.

2.2 RECEPTACLES

-
- .1 Design R1:
 - .1 Heavy duty, specification grade duplex receptacles, CSA type 5-20R, 125 V, 15/20 A, U ground, with following features:
 - .1 Urea molded housing, white colour.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight (8) back wired entrances, four (4) side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
 - .6 Nylon face.
 - .7 Acceptable materials: Hubbell #HBL5262I or approved equivalent.
 - .8 Acceptable Manufacturers:
 - .1 Hubbell
 - .2 Pass & Seymour
 - .3 Eaton Wiring Devices
 - .4 Leviton
 - .2 Design R2:
 - .1 GFI duplex receptacles. Specification grade, CSA type 5-20R, 125V, 15-20A, U-Ground with the following features:
 - .1 White urea moulded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Eight (8) back wired entrances, four (4) side wiring screws.
 - .4 Triple wipe contacts and riveted grounding contacts.
 - .5 White nylon face.
 - .6 Trip rating: 4-6 mA.
 - .7 Tamper resistant.
 - .8 Visual indication of power 'on' and ground fault condition via LED lights.
 - .9 Self testing with test and reset buttons.
 - .10 Acceptable materials: Hubbell #GFR5262ITR or approved equivalent.
 - .11 Approved Manufacturers:
 - .1 Hubbell
 - .2 Eaton Wiring Devices.
 - .3 Pass & Seymour
 - .4 Leviton
 - .3 Other receptacles with ampacity and voltage as indicated.
 - .4 Use the receptacles of one (1) manufacturer throughout project.

2.3 **COVER PLATES**

- .1 Cover plates for wiring devices.
- .2 Provide the cover plates from one (1) manufacturer throughout project.

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- .3 Brushed Stainless steel, 1 mm thick, cover plates, for wiring devices mounted in flush-mounted outlet boxes.
 - .4 Electrogalvanized or cast aluminum cover plates with gaskets for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
 - .5 Self -closing, weatherproof spring-loaded cast aluminum or PVC cover plates, complete with gaskets for duplex or single receptacles as indicated. Exterior cover plates must be suitable for wet locations whether or not a plug is inserted into a receptacle.

PART 3 - EXECUTION

3.1 SWITCH, RECEPTACLE, AND COVER PLATE INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one (1) switch is required in one location.
 - .3 Mount toggle switches at height specified in these Specifications or as indicated.
 - .4 Install size 1 identification lamicaid for control switches for pumps, motors, and process equipment.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one (1) receptacle is required in one location.
 - .2 Mount receptacles at height specified in these Specifications or as indicated.
- .3 Cover plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

3.2 FIELD QUALITY CONTROL

- .1 Test switches for proper operation.
- .2 Test receptacles for the following:
 - .1 Polarity and grounding.
 - .2 Voltage drop test (test at 12A for 15A devices). Voltage shall be within 5% of transformer secondary voltage.
- .3 Record results including any deficiencies corrected.

END OF SECTION

PART 1 - GENERAL

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 00.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

- .1 Bolt-on moulded case circuit breaker, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .2 Common trip breakers: with single handle for multiple applications.
- .3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 5 to 10 x current rating.
- .4 Circuit breakers with interchangeable trips on units over 200A.
- .5 Circuit breakers to have interrupting rating (momentary RMS symmetrical) as indicated.

2.2 THERMAL MAGNETIC BREAKERS

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping.
- .2 Provide ground fault interrupter type (5mA maximum) for circuits so marked.

2.3 MAGNETIC BREAKERS

- .1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

2.4 SOLID STATE TRIP BREAKERS

- .1 Moulded case circuit breaker to operate by means of a solid state trip with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload conditions, and long time, short time and instantaneous tripping for phase and ground fault (where indicated) short circuit protection. Trip unit to have independent adjustable long time and short time pick-up, ground fault pick-up, ground fault delay.

2.5 OPTIONS

- .1 Provide enclosures for individual circuit breakers as indicated on the drawings.
- .2 Where noted on the drawings, the circuit breaker must be 100% rated.

2.6 MANUFACTURERS

- .1 Acceptable manufacturers to match pre-purchased equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.
- .2 Have new circuit breakers installed in panelboards that were supplied by others approved for installation in the existing panelboard. New circuit breakers are to match existing in type (where possible) and interrupting rating.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Electrical General Requirements: Section 26 05 00

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 00.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

- .1 Non-hazardous:
 - .1 Heavy duty, fusible and non-fusible horsepower rated, disconnect switch in size and voltage as indicated.
 - .2 Provision for padlocking in the off switch position by three (3) pad locks.
 - .3 Mechanically interlocked door to prevent opening when handle in ON position.
 - .4 Fuses: size and type as indicated.
 - .5 Fuse holders: suitable without adaptors, for type and size of fuse indicated.
 - .6 Quick-make, quick-break action.
 - .7 ON-OFF switch position indication on switch enclosure cover.
 - .8 Provide equipment identification in accordance with Section 26 05 00.
 - .9 Enclosure:
 - .1 NEMA Type 4X (stainless steel) in wet/damp and/or corrosive areas and outdoors.
 - .10 Provide switches complete with window to view open/close status of disconnect switch blades.
 - .11 Include auxiliary contacts (2 N.O.) rated 10A at 120 VAC. Auxiliary contacts must make after and break before the disconnect switch blades.
 - .12 Double throw disconnect switches to be suitable for two source one load application.
 - .13 Acceptable manufacturers: Schneider Electric, Eaton, Siemens.
 - .14 Suitable for use as service entrance equipment where required.

PART 3 - EXECUTION

3.1 DISCONNECT SWITCH INSTALLATION

-
- .1 Install disconnect switches complete with fuses, type, rating as indicated on drawings.
 - .2 Install true, plumb and square to building lines.
 - .3 Confirm disconnect switch has proper clearance for operation of handle.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 IEEE 1100 - IEEE Recommended Practice for Powering and Grounding Sensitive Electronic Equipment; 2005.
- .2 IEEE C62.41.1 - IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits; 2002 (Reaffirmed 2008).
- .3 UL 1283 - Standard for Electromagnetic Interference Filters; Current Edition, Including All Revisions.
- .4 UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.2 DESCRIPTION OF WORK

- .1 This section specifies requirements for the supply and installation of Transient Voltage Surge Suppression (SPD) for the protection of the building electrical system.

1.3 SUBMITTALS

- .1 Provide shop drawings with wiring diagrams, installation information, testing and maintenance procedures, and operational information for the transient protection system.
- .2 Provide safety data as specified in Section 01 10 00.
- .3 Indicate:
 - .1 Dimensional Drawing indicating proposed mounting arrangements.
 - .2 Written functional description of the transient protection circuit in terms of components, configuration, design approach, and performance capability.
 - .3 The means of connection of the SPD to the electrical distribution system.
 - .4 Have the manufacturer provide UL 1449, data card showing the Suppressed Voltage Rating (SVR) for the specific catalogue number with data clearly demonstrating the maximum surge current rating has been tested on a complete SPD unit including all necessary fusing/overcurrent protection, thermal disconnects, integral disconnects and monitoring systems.
 - .5 Submit data demonstrating the complete SPD unit, including all overcurrent protection, is fully capable of a minimum repetitive surge current rating of 12,000 ANSI/IEEE C62.41.1, Category C3 (10kA) impulses without failure or a change in performance characteristics of more than 10%.

1.4 EXTENDED WARRANTY

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- .1 Provide an extended product warranty for a period of not less than 10 years from the date of Substantial Completion. Warranty to cover unlimited replacement of system protection modules during warranty period. The first five (5) years of this warranty must include any field labour required to perform repair or replacement work.

1.5 OPERATION AND MAINTENANCE DATA

- .1 Provide maintenance data for SPD for incorporation into manual specified in Section 01 10 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- .1 Acceptable manufacturers:
 - .1 Liebert.
 - .2 Total protection solution.
 - .3 Eaton Clipper Supervisor series.
 - .4 Schneider Electric.
 - .5 CITELE
- .2 Inclusion in this list does not exempt the requirements that any proposed manufacturer must be compliant with the specifications.

2.2 ENVIRONMENTAL

- .1 General requirements:
 - .1 No audible noise must be generated.
 - .2 Operating Conditions:
 - .1 0 - 50 Degrees C
 - .2 15 - 85 Percent Humidity Non-Condensing

2.3 SURGE PROTECTIVE DEVICE (SPD)

- .1 General requirements for service entrance:
 - .1 Rated for a 600Y/347 volt, 60 Hertz, 3-phase, 4-wire system for Lift Station 1, 3.
 - .2 Rated for a 120/240V, 60 Hertz, 1-phase, 3-wire system for Lift station 2.
 - .3 Provide surge suppressors in accordance with the following requirements:
 - .1 Unit to be parallel in design and connect in parallel into the electrical system. Each surge suppression element (MOV) must be individually fused so that a failure of one element and/or fuse must not affect other surge suppression elements.
 - .2 Unit to be UL 1449, 4th Edition Listed as a type 1 SPD.

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- .3 The maximum continuous operating voltage (MCOV) must be greater than 115% of the nominal system operating voltage.
 - .4 Maximum Voltage Protection Rating (VPR) for 600Y/347 Volt systems as follows:
 - .1 L-L = 3000V
 - .2 L-N = 1800V
 - .3 L-G = 1800V
 - .4 N-G = 1800V
 - .5 Unit to provide minimum surge current rating of 80,000 amperes per mode (L-N, L-G, N-G) and 160,000 amperes per phase based on ANSI/IEEE C62.41 standard 8 by 20 microsecond current waveform.
 - .6 Unit to have a short circuit current rating of 200,000A at rated voltage or greater.
 - .7 EMI/RFI filtering.
 - .8 Response time no greater than 1 nanosecond for any of the individual protection modes.
 - .9 Unit to include solid-state, long-life externally mounted LED visual status indicators that indicate the on- line status and operational integrity of each phase of the unit.
 - .10 Unit to have a Form C summary alarm output contact rated for at least 1 amp at 120VAC for remote annunciation of SPD status.
 - .11 Include feature that tests the integrity of all modules, MOVs and fuses in the system.
 - .12 Unit to have an audible alarm with an alarm on/off switch to silence the alarm.
 - .13 Provide a surge counter to totalize transient voltage surges in both the normal and common mode. Provide the counter with a 10-year battery back-up to maintain counts in the event of power loss.
 - .14 Enclosure: NEMA 1 unless noted otherwise.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install surge suppression system where indicated on the drawings and in accordance with the manufacturer's written instructions.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This section describes the requirements for the supply, installation, testing and commissioning of instrumentation controls.
- .2 At Lift Stations No. 1, 2 and 3, the Pump Control package including control panels, enclosures, power and control circuitry, all have been pre-selected by the Owner. This equipment will be installed as part of the Work.

1.2 RELATED SECTIONS

- .1 Moulded Case Circuit Breakers: Section 26 28 21.

1.3 SHOP DRAWINGS

- .1 Provide shop drawings for ancillary equipment required for installation of the pre-selected equipment in accordance with Section 01 10 00.

1.4 OPERATION AND MAINTENANCE DATA

- .1 Assist the Equipment Supplier in producing complete operation and maintenance data in accordance with Section 01 10 00.
- .2 Include in manuals information based on the following requirements:
 - .1 Operation and maintenance instructions to be sufficiently detailed with respect to design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, calibration, maintenance, and repair of the supplied equipment.
 - .2 Provide "as-built" wiring and schematic diagrams and general arrangement drawings for control panels including a bill of materials.
 - .3 Test and calibration sheets for the installed instruments.

1.5 COORDINATION

- .1 Coordinate with the Equipment Supplier to confirm the load demands are attained and that the pumping system is fully compatible with the control devices.

1.6 REFERENCES

-
- .1 Carry out the Work of this Section in accordance with all applicable Federal, Provincial, Municipal, and other laws/ordinances, and with the latest edition of the following standards which will be deemed to be included and form part of these specifications:
 - .1 American Society of Mechanical Engineers
 - .2 Institute of Electrical and Electronic Engineers.
 - .3 American Society for Testing and Materials
 - .4 Manufacturers Standardization Society.
 - .5 Canadian Standards Association
 - .6 Instrument Society of America
 - .7 Canadian Electrical Code
 - .2 ASME B16.5-2017, Pipe Flanges and Flanged Fittings: NPS 1/2 Through 24.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 All products herein, unless otherwise noted, have been preselected or will be provided by AFNWA.
- .2 Instrumentation and controls equipment must be of a proven design for each application and designed, manufactured, inspected, and tested in accordance with all applicable regulations, codes, and standards.
- .3 Select instrumentation and controls equipment to suit the process and environmental requirements for each application as described or implied in this specification and drawings.
- .4 Construct instrumentation and controls equipment to operate safely and reliably under all operating conditions without undue wear, vibration, heat, noise, or other operating problems. Parts subject to wear, corrosion, or other deterioration, or accessible and capable of convenient field maintenance.
- .5 All instrumentation and controls equipment must be certified by an agency (preferably CSA) recognized by the applicable provincial Electrical Inspection Department. Where there is no alternative to supplying equipment that is not appropriately certified, special approval from the applicable provincial Electrical Inspection Department will be required. All costs associated with this will be included in the quote.
- .6 All instrumentation and controls equipment must have a minimum enclosure rating of NEMA 4X (IP66).
- .7 Equipment requiring intrinsically safe wiring to meet a hazardous area classification shall come complete with all recommended intrinsically safe barriers, etc., as required to meet the applicable hazardous classification.
- .8 The minimum instrumentation and controls equipment electrical connection size will be 13 mm NPT.

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- .9 Instrumentation and controls equipment requiring a power supply will be 120 VAC, 60 Hz.
 - .10 All wired instrumentation and controls equipment must have provision for externally grounding the instrument housing/enclosure.
 - .11 Provide instrumentation and controls equipment complete with a securely fastened manufacturer's nameplate indicating instrument model, serial number, calibrated range, etc., as required for ordering a replacement item.
 - .12 All instruments must be EMI and RFI protected.
 - .13 All supplied instrumentation and controls must be rated for their applicable hazardous area classification.

2.2 PUMP CONTROL PACKAGE(PRE-SELECTED)

- .1 PUMP CONTROL PANEL IS PROVIDED BY AFNWA.

2.3 SUBMERSIBLE LEVEL SENSOR PRE PURCHASED BY OWNER

- .1 Refer to pre purchased product package and shop drawings for complete information.

2.4 FLOAT SWITCHES PRE PURCHASED BY OWNER

- .1 Refer to pre purchased product package and shop drawings for complete information.

2.5 FLOW INSTRUMENTS PRE PURCHASED BY OWNER

- .1 Refer to pre purchased product package and shop drawings for complete information.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- .1 The Equipment Supplier has granted the right to inspect the instrumentation and control equipment to any authorized representative of the Engineer or Owner before shipment from factory. If inspection is requested, 48 hours notice will be given in advance of the time when the equipment will be ready for inspection at the factory. The Owner will pay the costs associated with having the Engineer observe the testing.

3.2 DELIVERY

- .1 Coordinate deliveries of pre-selected equipment with the Equipment Supplier, Owner, and the Engineer.

3.3 INSTALLATION

- .1 Execute work in a professional manner so that it presents a neat appearance when completed.
- .2 Install instrumentation and control equipment being supplied by, or issued to, the Contractor where and as indicated on the drawings, and in accordance with the manufacturer's instructions. Manufacturer's installation instructions must be strictly adhered to.
- .3 The Drawings indicate the extent and general arrangement of the instrumentation and controls equipment. Exact installation locations, distances and levels will be governed by actual field conditions and is subject to approval by the Engineer. Field verify all dimensions.
- .4 If any departures from the original intent of the Drawings and/or the Specifications are deemed necessary by the Contractor, submit details of such departures with Drawings if necessary, together with reasons for the departure to the Engineer as soon as practical for approval. No such departure can be made without prior written consent of the Engineer.
- .5 Repair/replace equipment damaged during construction, or otherwise deemed defective or non-compliant with this specification, at no additional expense to the Contract. These expenses include all material, labour and other fees.
- .6 Unless otherwise specified, fabricate and erect all support brackets or mounting brackets required. Purchase all supplied instruments with all necessary mounting brackets from the instrument vendor.
- .7 Locate instruments to minimize the possibility of damage from high temperature, vibration, or humidity, and so they do not interfere with, or be damaged by, maintenance of other equipment. Instrument installation must also provide for easy accessibility for operation, inspection, and maintenance purposes.
- .8 Store materials in a manner as to ensure the preservation of their quality and fitness for the work, and to facilitate inspection by the Engineer/Owner at any time. Keep instruments and equipment clean and protect against damage, dirt, and moisture.
- .9 Protect installed equipment against water, dirt and other debris until it is commissioned. Use clear plastic sheeting of not less than 8-mil thickness for this purpose.

3.4 TESTING AND CALIBRATION EQUIPMENT

- .1 All test and calibration equipment used must be calibrated to an industry recognized standard and have affixed proof of calibration along with date of next calibration.

3.5 TESTING AND CHECK-OUT

-
- .1 Conduct all tests necessary to confirm material and workmanship are of the required degree of excellence, and that the supplied equipment will perform as specified (verify wiring, wire continuity checks, tubing leak tests, etc.).
 - .2 Calibrate all instruments, either purchased by or supplied to the Contractor before usage. Secure the services of qualified personnel (manufacturer's representative) and equipment to conduct field instrument calibration.
 - .3 Document the results of all tests/calibrations, make available to the Engineer and include in the project "Operations and Maintenance Manual" submission.
 - .4 Coordinate with all other Divisions suppliers for their required testing and commissioning procedures.
 - .5 Document instrument settings and include in the project "Operations and Maintenance Manual Submission".
 - .6 Provide services for such period, and for as many visits as necessary to put the installation in working order, and to ensure that the operating personnel are conversant with all aspects of equipment and operation.
 - .7 Coordinate with Engineer and Owner to schedule control supplier and pump supplier for proper set-up of pumps.

3.6 IDENTIFICATION

- .1 Locate manufacturer's nameplates so that they are easily read. Do not paint over plates.

3.7 COMMISSIONING AND START-UP

- .1 Coordinate testing/commissioning at all pump stations and assist the preselected equipment vendors during commissioning. Complete a point-by-point check for all control systems monitored field I/O points. Have the Equipment Supplier perform logic checks, communication checks, complete pump station integration, and equipment start-up tasks.
- .2 Provide technical personnel during this phase of the Work for instrument recalibration, re-wiring, reprogramming, etc., as required until the pump station control system is deemed ready for operation.
- .3 Perform a series of start/stops of the pumps under normal and emergency power to confirm proper operation of the pump station.
- .4 Calibrate, program, and verify level sensor and transmitter. Control elevations to be programmed on-site. Refer to drawings for elevations.
- .5 Verify and test operation of the float switches for alarming and for emergency operation (i.e.: level sensor failure).
- .6 Document the results of the testing, commissioning, and start-up.

.7 Program, test and calibrate the flow meter at each site.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Tree clearing and grubbing as specified in the Project Drawings and any tree clearing or grubbing necessary complete the works is included in the scope of work for the project.

1.2 RELEATED SECTIONS

- .1 Section 32 91 19.13 – Topsoil Placement and Grading.

1.3 DEFINITIONS

- .1 Clearing: consists of hydraulic mulching or cutting off trees, brush, and vegetative growth to not more than a specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris within the designated limits.
- .2 Grubbing: consists of excavation and disposal of stumps, roots, embedded logs, root mat, humus, organic and other objectionable material, boulders and rock fragments of specified size to not less than a specified depth (300mm), below existing ground surface.

1.4 STORAGE AND PROTECTION

- .1 Prevent damage to fences, trees, natural features, benchmarks, utility lines, site appurtenances, and root systems of trees outside designated limits.
 - .1 Repair damaged items to approval of Owner/Engineer.
 - .2 Replace trees designated to remain, if damaged, as directed by Owner/Engineer.

1.5 DESIGNATED LIMITS

- .1 Refer to existing condition plan to see limit of clearing and grubbing.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

-
- .1 Inspect site and with Owner/Engineer, items designated to remain.
 - .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
 - .3 Notify utility authorities before starting work.

3.2 CLEARING

- .1 Tree clearing to be completed prior to April 12th and after September 15th of each year. Tree clearing outside of this window outside of this window is to be done following a bird survey and with the approval of the Owner/Engineer. The Contractor will be responsible to arranging for and paying for the bird survey.
- .2 Begin clearing operations only after limits of clearing have been established, marked and agreed to by the Owner/Engineer on site.
- .3 Clear all trees, and surface debris within the limits indicated on the Drawings and as directed by the Owner/Engineer.
- .4 No trees or brush shall be cut down outside the limits indicated on the Drawings with the exception of any tree considered unsafe by the Owner/Engineer and no such tree shall be cut down unless marked for cutting.
- .5 Clear as indicated on the drawings or directed by Owner/Engineer. Height of stumps left from clearing operations to be not more than 300 mm above ground surface.
- .6 Do not cut down vegetation outside designated limits of clearing with the exception of any tree considered unsafe. Do not cut any such tree unless marked for cutting.
- .7 Cut off unsound branches on trees designated to remain as directed by Owner/Engineer.

3.3 GRUBBING

- .1 Grub out stumps, roots, embedded logs, humus, organic and other objectionable material to not less than 300 mm below ground surface.
- .2 Remove stumps using a stump-pulling machine or other mechanical device.
- .3 Grub depth to be 300 mm below existing grade.

3.4 DISPOSAL

- .1 Remove all cleared and grubbed materials off site.
 - .1 Leave all cleared and grubbed areas clean and presentable.
 - .2 All clearing, grubbing, excavation, backfilling and storage of materials is to be confined to the designated limits.

3.5 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations to approval of Owner/Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 33 - Excavation, Trenching and Backfilling.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM D698-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).

1.3 EXISTING CONDITION

- .1 Known underground and surface utility lines and buried objects to be verified prior to commencement of construction.

1.4 PROTECTION

- .1 Protect and/or transplant existing fencing, trees, landscaping, natural features, benchmarks, buildings, pavement, surface or underground utility lines which are to remain as directed by the Owner/Engineer. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain roads to prevent accumulation of construction related debris.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Fill material: in accordance with of Section 31 23 33 - Excavating, Trenching and Backfilling.
- .2 Excavated material from site is to be disposed of off of site as detailed in Section 31 23 33 - Excavating, Trenching and Backfilling and is not to be reused for site grading.

PART 3 - EXECUTION

3.1 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated on the drawings.

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- .2 Slope rough grade away from building 1:50 minimum or as indicated on drawings and as directed by Engineer.
 - .3 Grade ditches and swales to depth required for maximum run-off and as indicated. Minimum grade in swales is to be 2.0% unless otherwise noted.
 - .4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
 - .5 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:
 - .6 90% under landscaped areas.
 - .7 98% under footings and concrete slab-on grade and pavement structure.
 - .8 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 TESTING

- .1 Inspection and testing of soil compaction will be carried out by an approved testing laboratory. Costs of tests will be paid by the Owner/Engineer.

3.3 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to complete excavation of all types of material encountered, placing of backfill, disposal of unsuitable and surplus material and furnishing backfill material as specified below, all as shown on the Drawings and as specified in this Section.
- .2 The work generally includes, but is not necessarily limited to the following items:
 - .1 Cut and disposal of excavated material off site.
 - .2 Trench excavation and backfilling for pipelines, conduit and appurtenances.
 - .3 Excavating of common and rock materials.
 - .4 Structure excavation for manholes, chambers and appurtenances.
 - .5 Supplying and placing material under slabs where required.
 - .6 Control of water by dewatering.
 - .7 Providing imported structural fill material when required.
 - .8 Removal and disposal of surplus and/or unsuitable material.
 - .9 Sheet piling, shoring and bracing to support trench walls, sides of excavations, existing structures or utilities.
 - .10 Backfilling where required.

1.2 RELATED SECTIONS

- .1 Section 32 91 19.13 - Topsoil Placement and Grading.
- .2 Section 31 23 13 - Rough Grading.

1.3 REFERENCES

- .1 ASTM D1557-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- .2 ASTM D698-00, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).
- .3 New Brunswick Department of Transportation and Infrastructure (NB DTI), Standard Specification for Highway Construction, January 2023.

1.4 DEFINITIONS

- .1 Unsuitable material: all organic or excavated material which is not suitable for use in Work and must be disposed of offsite at an approved facility.

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- .2 Rock: material which requires drilling, blasting, ripping or breaking up with power operated tools for its removal, and boulders and pieces of concrete exceeding one (1) cubic metre in volume. Frozen material will not be classified as rock.
 - .3 Topsoil: soil capable of supporting good vegetative growth and suitable for use in top dressing and landscaping in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
 - .4 Common: materials of whatever nature, which are not included under the definition of solid rock, or topsoil, including dense tills or hardpan which can be ripped and excavated with heavy construction equipment.
 - .5 Surplus material: excavated material not required for re-use.
 - .6 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.

1.5 EXISTING STRUCTURES AND UNDERGROUND SERVICES

- .1 The Contractor will confirm with appropriate agencies the location of existing underground utilities within the work area. Agencies include, but are not limited to, Aliant, Rogers Cable, Liberty Utility Services NB and NB Power.
- .2 Furnish temporary support, adequate protection and maintenance of all underground and surface features encountered in the progress of the work, under the direction of the Owner/Engineer.
- .3 Restore, upon completion of the work, features which have been disturbed.
- .4 Protect trees, fences, poles and other property and surface structures unless their removal is shown on the Drawings or authorized by the Owner/Engineer.
- .5 Wherever obstructions not shown on the Drawings are encountered during progress of the work and interfere to such an extent that an alteration in the Works is required, the Owner/Engineer shall have the Engineer to change the Drawings and order a deviation from the line and grade or arrange the removal, relocation and reconstruction of the obstructions. The Contractor shall have no claim for any delays resulting from obstructions encountered during the progress of the work.
- .6 Proceed with caution in excavation and preparation of trenches so exact location of all buried pipes and services and underground structures may be determined and be responsible for repair of pipes, services, and structures when broken or otherwise damaged.
- .7 Whenever it is necessary to explore and excavate to determine the location of existing underground utility structures, make such examination and excavation at no additional cost to the Contract.

1.6 SUPPORT OF EXCAVATION

- .1 Suitably slope or properly shore sides of excavations according to site conditions, all in accordance with the New Brunswick Occupational Health and Safety Act.
- .2 The choice of any method of support shall be the responsibility of the Contractor. However, drawings and calculations for the method of support selected, designed and stamped by a qualified professional engineer registered or licensed in the Province of New Brunswick, and in accordance with the Provincial safety requirements, are to be submitted to the Owner/Engineer for review before its use.
- .3 If it is desirable that any support, other than that which may be shown on the Drawings, be left in the excavations, then the Owner/Engineer will issue instructions accordingly.
- .4 Take every precaution against slips or falls, but if any should occur, at once make good the same. If any such slip or fall affects or may affect the stability of the permanent work, execute such remedial work as necessary, including filling up of any space left by the slip or fall with approved granular material. Submit proposed remedial work to Owner/Engineer for review.
- .5 Excavation and embankment limits are not to encroach upon adjacent property boundaries. Contractor to verify the location of adjacent property boundaries prior to the start of construction. Use methods of support including sheet piling, shoring or other support method as required, at no additional cost to the Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Selected Backfill: common material from site excavation, free from stumps, trees, roots, sod, organics, rocks, boulders, masonry and any other deleterious materials. Material to be well graded having a maximum particle size not exceeding 300 mm in diameter. The material shall be free from frost and shall not be placed on frozen ground or in water. It must have a moisture content that will allow compaction to the specified densities.
- .2 Common borrow: where material additional to that obtained from excavation on site is required to complete backfilling, provide this material from Contractor's own sources unless otherwise directed. Material shall be as specified for Selected Backfill Material.

Sieve Size	% Passing
125mm	100
100mm	95-100
75mm	82-100
50mm	62-100
37.5mm	52-100
19mm	30-90
9.5mm	22-79
4.75mm	16-66
2.36mm	12-55
1.18mm	9-44
300um	4-25

75um	0-7
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- .3 Pipe foundation material: clear stone which will pass a 75 mm sieve but will be retained on a 50 mm sieve. Pipe foundation material to be used in situations where soft material is encountered in bottom of trench. Notify Owner/Engineer prior to use.

- .4 Stone bedding materials: well graded, clear stone conforming to concrete aggregate as follows:

Sieve Size	% Passing
25.4mm	100
19mm	75-100
9.5mm	0-75
4.75mm	0-15
2.36mm	0-5

- .5 Crushed Rock Base: produced by the crushing and processing of rock to conform to the grading limits as set out in NBDTI Standard Specifications, Table 201-2 for aggregate base, 31.5 mm percent (%) passing.
- .6 Crushed Rock Subbase: produced by the crushing and processing of rock to conform to the grading limits as set out in NBDTI Standard Specifications, Table 201-2 for aggregate subbase, 75 mm percent (%) passing. Crushed rock subbase to be used under all asphalt areas and asphalt area zone of influence.
- .7 Crushed Gravel Subbase: Crushed gravel subbase shall be produced by the crushing and processing of gravel to conform to the grading limits as set out in NBDTI Standard Specifications Table 201-3 for aggregate subbase, 75 mm percent (%) passing when tested in accordance with ASTM C136 and C117. Crushed gravel subbase to be used in landscape areas and under sidewalk.
- .8 Rigid insulation: to CAN/ULC-S701-1997, Type 4, expanded polystyrene, minimum compressive strength 400 kPa.
.1 Acceptable products: Dow Chemical HI60, Owens Corning Cellar Foamular 600.
- .9 Geotextile: non-woven, needle punched polyester filter fabric.
.1 Acceptable product: Terrafix 270R, or approved equivalent.
- .10 Geogrid: Triaxial Geogrid.
.1 Acceptable product: Tensar TX-190, or approved equivalent.
- .11 Structural Engineered Fill (SEF): Well graded crushed rock as per item Crushed Rock Subbase or approved equivalent. SEF to be compacted to 98% Standard Proctor.

PART 3 - EXECUTION

3.1 EXCAVATION - GENERAL

- .1 Excavate in all kinds of materials including rock material encountered on Site and make own computations of amounts and nature of excavation required. Stockpile fill materials in areas designated by the Owner/Engineer.
- .2 Select method of excavation, support and dewatering suitable for the works and as specified in clause 1.5 and as approved by the Owner/Engineer. Submit proposed method for review.
- .3 Protect property and structures above and below ground in accordance with the Contract.
- .4 Bear foundations, footings, slabs or undersides of all structures including pipe surrounds on the material as shown on the Drawings and as described in the Specifications and neatly finish all bearing surfaces to the required levels and grades.
- .5 Found excavated surfaces on solid undisturbed ground or rock fill. If the excavated surface is unsuitable, the Owner/Engineer will determine what work is required to secure a proper foundation. If such work is due solely to the nature of the ground, then the Owner/Engineer will measure the work, but if such work is due to any act or default of the Contractor in carrying out of the Works, resulting in disturbance of natural ground conditions, then the Contractor shall execute such work at no additional cost to the Contract.
- .6 Pile excavated material a safe distance away from sides of trench so it will not endanger personnel and the work, reduce sight distances, and obstruct roadways.
- .7 Do not obstruct drainage ditches and natural watercourses.
- .8 The Owner/Engineer reserves the right to require surplus material to be placed for embanking, general grading or other improvement or use on site, for the general benefit of the Owner.
- .9 Control grading so that the surface of the ground will be properly sloped to prevent water from running into excavated areas. Promptly remove any water which accumulates in excavations.
- .10 Place excavated soil to be re-used as backfill in stockpiles properly graded and sealed against rain.
- .11 All topsoil and loose to compact silty sand is to be excavated and removed from site.

3.2 DRAINING, PUMPING AND THAWING

- .1 Keep all excavations and trenches free of water at all times. Control excavations to prevent surface water running into excavated areas.
- .2 Do all work in connection with dewatering and supply and maintain on the work, pumps, in number and capacity sufficient to keep bottom of all excavations dry and free from water at all times so placing of pipe and manholes, will be done in the dry. Operate all equipment for as long as necessary.

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- .3 Dispose of water removed from excavations in a manner that will prevent injuries to public health or private property or to any operation of the work completed or under construction. Do not pump water containing silt or other material in suspension into streams or drainage courses.
 - .4 Ensure that all sub-drains, sump holes, wells or the like required for dewatering shall not endanger the stability of the Works. On completion of the work completely backfill and consolidate excavations.
 - .5 Excavate, remove or thaw out frozen ground as necessary. Replace excavated material with approved granular material at no additional cost to the Contract.
 - .6 Take precautions to prevent uplift of pipe or structures.
 - .7 Do not drain water from excavation into sewer unless approved by Owner/Engineer.

3.3 ROCK EXCAVATION

- .1 No material except that described as rock in Clause 1.3.2 of this specification will be classified as rock.
- .2 No soft or disintegrated rock, no loose or previously blasted rock or broken stone smaller than defined volume limits and no rock exterior to the pay limits of the work which may fall into the excavation will be allowed as rock excavation.
- .3 Whenever rock is encountered take the elevation of the exposed rock following excavation. No allowance will be made for rock excavation before such measurements have been made.
- .4 Break rock to a depth of 300 mm below subgrade for the slab and grassed areas. Break rock to a depth of 300 mm below piping and footings.
- .5 Obtain Owner/Engineer approval of completed excavation.
- .6 Correct unauthorized over excavation with selected backfill material or rock fill.

3.4 TRENCH EXCAVATION

- .1 Trenches for piping and related excavations shall be of sufficient width and depth at all points to allow pipes to be laid, joints to be formed, and appurtenant structures to be built in a workmanlike manner, and when needed, to allow for sheeting and shoring, pumping, draining, and for removing and replacing all materials unsuitable for foundations.
- .2 Excavate trenches so pipe can be laid to the alignment and depth required. Excavation length to be not more than pipe length that can be laid and backfilled in one day. Brace and drain trench so workers may work safely and efficiently.
- .3 Remove organic material and soft deposits to a depth where medium dense to dense materials are encountered as designated by the Owner/Engineer.

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- .4 Do not stockpile excavated materials alongside trench if the bearing soil will cause trench side failure or bottom uplift and affect pipe alignment.

3.5 UNSUITABLE MATERIAL EXCAVATION

- .1 Notify Owner/Engineer when materials unsuitable for use in the work are encountered and remove to depth and extent as directed.
- .2 Backfill excavations with pipe foundation material or selected backfill material as directed by the Owner/Engineer.
- .3 Dispose of unsuitable material off-site at an approved facility at no additional cost to the contract.

3.6 BACKFILLING - GENERAL

- .1 After pipelines and structures have been built, backfill trenches and other excavated areas with materials shown on Drawings or as herein specified. Remove timber and debris from excavation before backfilling is commenced. Do not cover up or put out of view any work until it has been examined, measured, and approved by the Owner/Engineer. If any work is covered without approval of the Owner/Engineer, it must, if required, be uncovered for examination.
- .2 Minimum gravels under slab to be [31.5] mm minus Crush Rock Base (item 2.1.8), compacted to 98% Standard Proctor ASTM D1557. Crushed Rock base is incidental to the Work. Thickness as shown on the drawings.

3.7 BACKFILLING STRUCTURES

- .1 After installation of structures, clean excavations of trash and debris. Backfill shall consist of selected backfill material or material shown on Drawings. Place material to meet following requirements and approval of the Owner/Engineer.
 - .1 Place backfill in horizontal layers not more than 300 mm deep.
 - .2 Compact each layer by rollers, mechanical tampers, or other suitable equipment to obtain a density of not less than 98% Standard Proctor density ASTM D1557.

3.8 BACKFILLING TRENCHES

- .1 Place backfill in 300 mm layers and compacted to 98% maximum dry density per ASTM D698. Thoroughly compact each layer before placing next layer.
- .2 During backfilling, keep trenches free of water at all times and controlled so as to prevent surface water running into excavated areas. Remove silty materials which become wetted and subsequently liquid or extremely plastic.
- .3 Leave surface of backfill initially high and repair settlement of trench backfilling.

3.9 CLEAN-UP

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for supplying, transporting, placing and rolling hot-mixed asphalt concrete pavement material.

1.2 REFERENCES

- .1 New Brunswick Department of Transportation and Infrastructure (NBDTI), Standard Specifications for Highway Construction, Latest Version.

1.3 SAMPLES

- .1 At least 2 weeks prior to commencing work, inform Authority of source of aggregates and asphalt cement and provide access for sampling.
- .2 Preliminary approval of any sample of any material shall not constitute a final approval of material or its source of supply.
- .3 All materials to be incorporated in the work shall be continuously and regularly sampled and tested in the field and in the laboratory and shall comply with the requirements of the material specification.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Tack coat shall be as per NBDTI Standard Specifications.
- .2 Asphaltic material: hot mixed, hot laid combination of mineral aggregates, uniformly coated and mixed with an asphaltic binder in a suitable mixing plant. Asphaltic materials and aggregates shall meet the requirements of the NBDTI Standard Specifications .
- .3 Composition of mixture: to grading and asphalt requirements in NBDTI Standard Specifications. Lower course asphalt concrete pavement shall be NBDTI Type B. Upper course asphalt concrete pavement shall be NBDTI Type D to the thickness shown on the Drawings.

PART 3 - EXECUTION

3.1 INSPECTION OF EXISTING GRANULAR BASE

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- .1 Before paving, reshape existing granular base as required to bring it to subgrade elevations indicated. The adjustment of existing structures for placement of lower course and upper course will be considered incidental to the Work and will not be paid for separately.

3.2 EQUIPMENT

- .1 Pressure distributor:
 - .1 Distributor to be designed, maintained, equipped and operated that asphalt concrete pavement at even temperature may be applied in a uniform manner on width up to 4.5 metres at readily determined and controlled rates.
 - .2 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.

3.3 ASPHALT PAVING

- .1 Prior to laying mix, clean surface of loose and foreign material.
- .2 Place asphalt concrete pavement to thicknesses, grades and lines indicated unless otherwise directed by Authority. Carry out interface with existing asphalt as per NBDTI Standard Specifications.
- .3 Placing conditions:
 - .1 Place asphalt concrete pavement only when air temperature is above 5°C for lower course and 10°C for upper course.
 - .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .3 Do not place asphalt concrete pavement when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .4 Paving operations shall only be conducted during daylight hours unless specifically altered by written approval of the Owner/Engineer.
- .5 The placement of the new asphalt concrete mix shall commence within 14 days of the commencement of the cold milling operation and shall continue on a daily basis until the entire milled surface has received a lift of asphalt concrete.
- .6 When placing asphalt concrete surface mix, the surface temperature of the material to be overlaid shall be a minimum of 5°C.
- .7 Milled and aged asphalt concrete surfaces shall be treated with bituminous tack coat in accordance with NBDTI Standard Specifications.
- .8 Contact edges of existing mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall receive an application of tack before placing the asphalt concrete.
- .9 Place, roll, and compact asphalt concrete pavement in accordance with NBDTI Standard Specifications.

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- .10 Saw cut all existing asphalt edges to be matched to and mill a 40 mm deep, 300 mm wide keyway prior to placing asphalt.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 32 92 19.16 – Hydraulic Seeding

1.2 REFERENCES

- .1 Agriculture and Agri-Food Canada:
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment:
 - .1 PN1340-2005, Guidelines for Compost Quality.

1.3 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25:50), and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category A.

1.4 SUBMITTALS

- .1 Quality control Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

PART 2 - PRODUCTS

2.1 TOPSOIL

- .1 Topsoil shall be imported to site for the areas and thicknesses identified on the drawings.
- .2 Topsoil for seeded areas, sodded areas, tree pits and planting beds: Mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

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- .1 Friable loam shall contain a minimum of 4% organic matter for clay loams and 20% for sandy loams to a maximum of 20% by volume and having a pH of 6.0 to 7.0. Topsoil shall be free of admixture of subsoil, refuse, roots, stumps, branches, sod and stones larger than 25mm.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 25 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .3 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Fertilizer: Shall be complete commercial fertilizer specifically blended for promoting root development of newly seeded or sodded areas, and plant material as recommended in soils test results.
- .2 Sand: Washed coarse silica sand, medium to course textured.
- .3 Organic Matter: Compost Category A in accordance, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements
- .4 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1 mm sieve, 50% passing 0.12 mm sieve.
 - .3 Fertilizer: Industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

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

3.2 PREPARATION OF EXISTING GRADE

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- .1 Verify that grades are correct.
 - .2 If discrepancies occur, notify Owner/Engineer and do not commence work until instructed.
 - .3 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
 - .4 Remove debris, roots, branches, stones in excess of 50 mm diameter for seed or sod areas.
 - .5 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .6 Remove debris which protrudes more than 25mm above surface.
 - .7 Dispose of removed material off site under direction of Owner/Engineer.
 - .8 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .9 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Owner/Engineer has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil as indicated to following minimum depths after settlement.
 - .1 150 mm for seeded areas.
 - .2 150 mm for sodded areas.
 - .3 Depth of root ball and width as per detail for trees.
 - .4 Manually spread topsoil/planting soil around trees, existing shrubs and obstacles.

3.4 ACCEPTANCE

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

3.5 SURPLUS MATERIAL

- .1 Dispose of surplus topsoil off site as directed by Owner/Engineer. All other surplus material to be removed off site to a location to be determined by Contractor.

3.6 CLEANING

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments, micronutrients and FRM product.
- .2 Submit in writing 7 days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.
- .3 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 QUALITY ASSURANCE

- .1 Qualifications: Work shall be carried out by a member in good standing with the Canadian Nursery Landscaping Association (CNLA), unless otherwise approved by the Owner/Engineer.

1.4 SCHEDULE

- .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
- .2 Schedule hydraulic seeding during local growing season when moisture level ensures and supports germination and growth (April-June or September-October).
 - .1 Should sod be required due to hydraulic seeding outside of local growing season, there shall not be an increased cost to the Owner.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

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- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Inoculant containers to be tagged with expiry date.
 - .3 Storage and Handling Requirements:
 - .1 Store fertilizer and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.6 WARRANTY

- .1 Contractor hereby warrants that seeding will remain free of defects for 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Owner/Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 General Site Mixture:
 - .2 35% Creeping Red Fescue.
 - .3 35% Chewing Fescue.
 - .4 10% Hard Fescue.
 - .5 10% Sheep Fescue.
 - .6 10% Perennial Ryegrass.
 - .7 Seed rate: 2.56kg/100m2.
- .2 Mulch: Specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I Mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
 - .2 Type II Mulch:
 - .1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.

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- .3 Tackifier: Water dilutable, liquid dispersion.
 - .4 Water: Free of impurities that would inhibit germination and growth.
 - .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and Regulations.
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
 - .6 Inoculants: Inoculant containers to be tagged with expiry date.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify conditions of substrate previously installed under other Sections or Contracts are acceptable for hydraulic seeding in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Owner/Engineer.
 - .2 Inform Owner/Engineer of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Owner/Engineer.

3.2 PROTECTION OF EXISTING CONDITIONS

- .1 Protect structures, sewerage piping and drainage field systems, signs, flagpoles, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by Owner/Engineer.

3.3 PREPARATION OF SURFACES

- .1 Do not perform work under adverse field conditions such as wind speeds over 10km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Fine grade areas to be seeded free of humps and hollows.
 - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25mm.
- .4 Ensure areas to be seeded are moist to depth of 150mm before seeding.
- .5 Obtain Owner/Engineer approval of grade and topsoil depth before starting to seed.
- .6 Obtain Owner/Engineer approval of installation of all sewerage piping and drainage field installation prior to seeding areas identified on drawings.

3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods based on test results and recommendations. Fertilize minimum three (3) times within the warranty period, in accordance with fertilizing schedule and soils test recommendations.

3.5 PREPARATION OF SLURRY

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

3.6 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Capable of seeding by 50m hand operated hoses and appropriate nozzles.
 - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture applied per hectare:
 - .1 Seed: Grass mixture(s) as indicated.
 - .2 Mulch: Type I and II kg as recommended by supplier.
 - .3 Tackifier: As recommended by supplier.
 - .4 Water: Minimum 30,000 L.
 - .5 Fertilizer: As recommended by supplier.
 - .6 Lime: As determined by soils test recommendations for turf.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300mm into adjacent grass areas or sodded areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.

3.7 CLEANING

- .1 Leave work area clean at end of each day.
- .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

3.8 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Owner/Engineer.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by Owner/Engineer.
- .3 Grass Mixture(s):
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Owner/Engineer.
 - .3 Fertilize seeded areas after mowing in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles: water in well.
 - .4 Control weeds by mechanical means utilizing acceptable integrated pest management practices.
 - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.10 ACCEPTANCE

- .1 Seeded areas will be accepted by Owner/Engineer provided that:
 - .1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas have been mown at least three times.
 - .3 Areas have been fertilized.
- .2 Areas seeded in Autumn will achieve final acceptance in the following Spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.11 MAINTENANCE DURING WARRANTY PERIOD

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- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Repair and reseed dead or bare spots to satisfaction of Owner/Engineer.
 - .2 Fertilize areas in accordance with approved fertilizing program/schedule. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .3 Eliminate weeds by mechanical means to extent acceptable to Owner/Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This Section specifies requirements for supplying, transporting and installing precast manholes, and structures as shown on the Drawings and as directed by the Owner/Engineer. Work includes supply and installation of concrete bases, precast sections, metal castings and testing.

1.2 RELATED SECTIONS

- .1 Section 31 23 33 - Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 ASTM A48/A48M-22, Standard Specification for Gray Iron Castings.
- .2 ASTM A536-24, Standard Specification for Ductile Iron Castings.
- .3 ASTM C478/C478M-22, Standard Specification for Circular Precast Reinforced Concrete Manhole Sections (Metric).
- .4 CSA A23.1:24/A23.2:24, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
- .5 CSA A257 Series:24, Standards for Concrete Pipe and Manhole Sections.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings, for precast sections and manholes. Include dimensions, opening locations, stub locations in precast concrete structures, frames and covers.
- .2 Submit manufacturer's test data and certification that materials meet requirements of this section. Include manufacturer's drawings, information, size of components, dimensions and details where pertinent.

1.5 HANDLING AND STORAGE

- .1 Prevent damage to materials during storage and handling.
- .2 Store gaskets in cool location out of direct sunlight, and away from petroleum products.

PART 2 - PRODUCTS

2.1 MANHOLES AND CHAMBERS

- .1 Manholes shall be of pre-cast concrete sections meeting the requirements of CAN/CSA A257.4 and ASTM C478. Joints between sections will be rubber gasket or Ram-nek gasket as indicated on the detail drawings and meeting the requirements of CAN/CSA A257.3. Adjusting rings: precast concrete, to ASTM C478M.
- .2 Sanitary manhole base sections shall be of pre-cast concrete with reinforced concrete slabs with benching within. Manhole bases will also have cast-in rubber gaskets to suit the inlet and outlet pipes and factory installed benching. Any additional holes required in the field shall be core-drilled and a "Kor-n-seal" connector inserted.
- .3 Manhole frame and covers/frames and grates shall be as per NBDTI Standard Specifications, latest edition.
- .4 Non-shrink grout: pre-mixed, dry pack or pourable type containing non-metallic aggregate, plasticizing agents and cement, minimum compressive strength of 45 MPa at 28 days.
- .5 Rigid Insulation: as specified in Section 31 23 33 - Excavating, Trenching and Backfilling.
- .6 Supplier to provide detailed design drawings, installation instructions and shop drawings for review by the Owner/Engineer prior to material delivery.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

- .1 Excavation and backfill in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.

3.2 INSTALLATION

- .1 Carefully inspect products for defects and remove defective products from site.
- .2 Construct units plumb and true to the alignment and grade shown on the Drawings.
- .3 Complete units as pipe laying progresses.
- .4 Pump excavations dry and remove soft and foreign materials before placing concrete bases.
- .5 Set precast concrete base on materials shown on drawings. Top of base to be level.
- .6 Set first ring section on precast base and make joint watertight with O-ring gaskets. Grout joints inside and out with non-shrink grout.
- .7 Plug lifting holes with non-shrink grout.

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- .8 Place stub outlets at elevations and in position indicated. Provide gasket type connection as indicated.
 - .9 Install benching where shown on the Drawings using concrete suitable for exposure classification C-2 as specified in CSA A23.1/A23.2.
 - .10 Form manhole bases to provide smooth U-shaped channels with depth equal to diameter of pipes or as indicated. Curve channels smoothly and slope uniformly from inlet to outlet. Benching to drain towards channel, 4% maximum slope.
 - .11 Install precast sections plumb and true with opening centered over upstream pipe.
 - .12 Make all joints watertight.
 - .13 Install frames and covers on top section to elevation shown on Drawings or as directed.
 - .14 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

3.3 WATERPROOFING

- .1 Install joint gaskets as per the manufacturer's recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 33 - Excavating Trenching and Backfilling.

1.2 WORK INCLUDED

- .1 This section specifies requirements for supplying, installing and testing sanitary gravity sewers to the lines, grades and dimensions indicated on the Drawings and as specified in this section.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings for all pipe, fittings, valves, and all other items necessary for a complete installation. Include details showing dimensions and tolerance of pipe and joint proposed.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Handle and store pipe, valves, fittings, in such a manner as to avoid shock and damage and as per manufacturer's recommendations. Do not use chains or cables passed through pipe bore.
- .2 Store gaskets in cool location, out of direct sunlight, and away from petroleum products.

1.5 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services and maintain existing flows during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
- .3 Notify Owner/Engineer and Owner a minimum of 24 hours in advance of any interruption in service.

PART 2 - PRODUCTS

2.1 SEWER PIPE

- .1 Acceptable products as per NBDTI Standard Specifications.

2.2 PIPE BEDDING MATERIAL

- .1 Bedding material: as specified in Section 31 23 33 – Excavating Trenching and Backfilling.

2.3 INSULATION

- .1 As specified in Section 31 23 33 – Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.
- .2 Provide proper implements, tools and facilities approved by the Owner/Engineer, for the safe and convenient prosecution of the work.
- .3 Take every precaution to prevent foreign material from entering the pipe.

3.2 TRENCHING AND BACKFILLING

- .1 Do trench excavation and backfilling work to Section 31 23 33– Excavating Trenching and Backfilling.

3.3 PIPE BEDDING

- .1 Place granular bedding material to depth indicated.
- .2 Shape bed true to grade to provide continuous uniform bearing surface for pipe exterior. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions in bedding as required to make joints.
- .4 Carry bedding material horizontally across actual trench width. Mounding bedding material will not be permitted.
- .5 After installation of pipe, place and compact bedding material to haunch line of pipe. Place and compact remaining bedding material to depth indicated above top of pipe before further compaction.

3.4 PIPE LAYING

- .1 Carefully lower pipe into the trench. Do not drop or dump materials into the trench.

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- .2 Lay and join pipes and fittings as specified herein and according to manufacturer's published instructions.
 - .3 Commence laying at outlet and proceed in upstream direction with bell ends of pipe facing upgrade.
 - .4 Prevent entry of bedding material, water or other foreign matter into pipe. Use temporary water-tight bulkheads when pipe laying is not in progress.
 - .5 Do not lay pipe when the trench bottom is frozen, underwater or when trench conditions or weather are unsuitable.

3.5 PIPE JOINTING

- .1 Install gaskets in accordance with manufacturer's published instructions. During cold weather store gaskets in heated area to assure flexibility.
- .2 Align pipe carefully before joining. Do not use excessive force to join pipe sections.
- .3 Support pipes as required to assure concentricity until joint is properly completed.
- .4 Keep pipe joints free from mud, silt, gravel or other foreign material.
- .5 Avoid displacing gasket or contaminating with dirt, petroleum products, or other foreign material. Remove, clean, reinstall and lubricate gaskets so disturbed.
- .6 Where deflection at joints is permitted, deflect only after joint is completed. Do not exceed maximum joint deflection recommended by manufacturer.
- .7 Cut pipe as required for fittings or closure pieces, square to centreline, and as recommended by manufacturer.
- .8 Make watertight connections to manholes and structures.
- .9 Complete each joint before laying next length of pipe.

3.6 PIPE CLEANING

- .1 Prior to testing, flush and clean gravity sewer to remove foreign materials.
- .2 Do not flush debris into receiving sewers.

3.7 TESTING

- .1 Test all sanitary gravity sewers. All tests to be made in the presence of the Owner/Engineer.
- .2 Provide all labour, equipment and materials required to perform leakage tests.

- .3 Air test each section of gravity sewer. A section is the length of pipe between successive manholes or termination points.
- .4 Provide plugs at each end of section, with one plug equipped for air inlet connection.
- .5 Fill test section slowly until a constant pressure of 28 kPa is reached. If ground water is above section being tested, Owner/Engineer may recommend increase in air pressure.
- .6 Allow minimum 2 minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
- .7 After 2-minute period, shut off air supply.
- .8 Decrease pressure to 24 kPa. Measure time required for pressure to reach 17 kPa. Minimum time allowed for pressure drop is as follows:

Pipe Diameter (mm)	Minimum Time Min:Sec
100 mm	1:53
150 mm	2:50
200 mm	3:47
250 mm	4:43
300 mm	5:40
375 mm	7:05
450 mm	8:30
525 mm	9:55
600 mm	11:20

3.8 **TESTS TO BE REPEATED**

- .1 Should test disclose leakage is greater than permissible amount, locate and repair defective pipe, or joint, to the approval of the Owner/Engineer.
- .2 Test to be carried out, at no extra cost to Contract to determine success or otherwise of remedial measures applied to pipework. These tests to be repeated at no extra cost to Contract until results show that remedial measures have been successful.
- .3 Following acceptance of field tests, should Owner/Engineer suspect the sanitary gravity sewer, for any reason, no longer complies with requirement of the test, the Owner/Engineer may order a second test and should the length of pipeline prove defective, the Contractor shall repair or make good the defect at no extra cost to Contract.
- .4 Cost of second test to be at no extra cost to Contract if test proves a defect. However, if this second test shows pipe to be satisfactory, cost of second test will be borne by Owner/Engineer.
- .5 Repair visible leaks regardless of test results.

3.9 **FLUSHING**

- .1 Flush sewer after installation. Do not flush debris into receiving sewers.

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- .2 Flushing operations to be approved and witnessed by Owner/Engineer.
 - .3 Flush through available outlets until foreign materials have been removed and flushed water is clear. Video showing debris, is to be flushed and re-videoed. Additional flushing and videoing required to remove debris is incidental to the Work.

3.10 CLOSED CIRCUIT TELEVISION INSPECTIONS

- .1 Prior to placement of asphalt upper course, the Contractor shall do a closed circuit television inspection (CCTV) of the storm and sanitary mains and catch basin laterals, or as directed by the Owner/Engineer.
- .2 The entire length of each sewer line between manholes shall be videoed, as well as through each manhole (the camera shall pan the interior of all manholes and catch basins). This will allow for viewing pipe-to-manhole joints, benching and connections of new sewers to existing sewers. Just prior to conducting the television inspection the Contractor shall run 3700 litres (L) of clear water through the new sewer main. The camera shall travel in the same direction as flow unless impractical due to location.
- .3 The Contractor shall notify the Engineer a minimum of 24 hours in advance of video inspection work as the Engineer's Representative shall be present when the water is introduced into the sewer and when the sewer is being video inspected. The Contractor shall use a colour pan and tilt camera specifically designed and constructed for sewer inspection. Lighting for the pan and tilt camera shall provide a clear picture of the entire periphery of the sewer. The pan and tilt camera shall pause, pan and visually inspect all service connections, pipe ends and maintenance or structural defects. The speed of travel shall be slow enough to inspect each pipe joint, tee connection, structural deterioration, infiltration and inflow sources, and deposits. The travel speed of the camera shall not, at any time, exceed nine metres per minute (9m/min).
- .4 The camera must be centered in the pipe to provide accurate distance measurements to locations of features in the sewer and these measurements shall be displayed and documented on the video. The video of the main lines for each street shall be completed on the same day and shall be continuously metered from the access manhole. All television inspection reports shall be within +/- 0.6m of the measured linear distance between manholes/points along the sewer centerline from the start of pipe to end of pipe.
- .5 All CCTV work shall conform to current National Association of Sewer Service Companies (NASSCO) – Pipeline Assessment Certification Program (PACP) standards. All CCTV inspections will be delivered entirely in electronic format (NASSCO export file) via external hard drive with the file named with the CCTV Contractor Company Name (eg. "Smith Video Services") as well as PDF pipe run reports. The entire survey shall be recorded in an approved electronic format submitted with electronic links between the data and the video.
- .6 The camera operator shall be a PACP certified operator and proof of certification shall be submitted with the reports. All PACP required header information must be fully and accurately entered on all CCTV reports in accordance with PACP Guidelines. Manhole ID (as per drawings) and Pipe ID (format to be "Upstream MHID – Downstream MH ID") for sewer line sections to be videoed shall be entered correctly in the PACP required header fields. All PACP Observations shall be identified on PACP reports.

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- .7 The video inspections and PDF pipe run reports shall include all mandatory NASSCO fields as well as:
 - .1 Time.
 - .2 Weather; and,
 - .3 Use of sewer.
 - .8 Manhole deficiencies noted during panning are to be recorded as MGO (Miscellaneous General Observation) with comments. Water ponding in gravity sewers that cannot be eliminated by flushing and cleaning will be considered as evidence of pipe settlement. Any and all defects such as water ponding, leaking joints, sags, improper grade or alignment, excessive deflection, obstructions, etc. shall be cause for rejection and such defects must be repaired by the Contractor at no expense to the Contract. The initial video inspection shall be at the cost of the Owner/Engineer. Any costs for re-video of sewer mains required to inspect repaired defects will be at the Contractor's expense. If the video report shows that debris is present in the pipe the Contractor shall flush and clean the pipe and re-video the line at the Contractor's expense. All CCTV inspections in electronic format (including PDF pipe run reports) shall be submitted to and approved by the Engineer prior to placement of upper course asphalt.
 - .9 Equipment: Provide equipment meeting following requirements:
 - .10 Self-contained monitoring unit and camera with remotely controlled lighting system capable of varying the illumination.
 - .11 Picture quality shall produce continuous 600-line resolution picture, showing entire periphery of pipe.
 - .12 A meter device with readings above ground or marking on cable to clearly identify exact location of camera.
 - .13 Definition of fault:
 - .1 Any pipe joint which displays a gap or spread, offset, gasket, or signs of infiltration.
 - .2 Any section of pipeline which is crushed, broken or displays cracks.
 - .3 Any variance in grade of pipeline.
 - .4 Any gravel, roots, or foreign material which may impede flow.
 - .5 Any deformation in shape of pipe.

3.11 CLOSED CIRCUIT TELEVISION INSPECTIONS

- .1 Upon completion of testing of each section remove all ancillary equipment and plug holes. Do not backfill around test plugs until inspected by Owner/Engineer.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This section specifies the requirements for supplying and installing sanitary forcemain and appurtenances. Work includes supply and installation of pipe and fittings, bedding material, backfill, compaction and testing of pipe as shown on the Drawings.

1.2 RELATED SECTIONS

- .1 Section 31 23 33 – Excavation Trenching and Backfilling.
- .2 Section 33 32 13 – Packaged Suction-Lift Pumping Stations

1.3 REFERENCE STANDARDS

- .1 ASTM A674 - Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids; 2018.
- .2 ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 2019 (Reapproved 2025).
- .3 ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014 (Reapproved 2021).
- .4 AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings; 2022.
- .5 AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2018.
- .6 AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings; 2012.
- .7 AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2023.
- .8 AWWA C115/A21.15 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges; 2025.
- .9 AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2023.
- .10 AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; 2019.
- .11 AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2023.
- .12 AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm); 2022.

1.4 SUBMITTALS

- .1 Submit manufacturer's test data and certification that pipe materials meet requirements of this section at least three (3) weeks prior to commencing work. Include manufacturer's drawings, information and shop drawings where pertinent.
- .2 Submit schedule of expected interruptions to Engineer for approval and adhere to interruption schedule as approved by Engineer.
- .3 Notify Engineer minimum of 24 h in advance of any interruption in service.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Do not damage pipe, fittings and accessories, and pipe coatings during delivery, handling, and storage.
- .2 Do not place materials on private property without written permission of property owner.

PART 2 PRODUCTS

2.1 FORCE MAIN PIPE MATERIALS

- .1 Ductile Iron Pipe:
 - .1 Ductile Iron Pipe: AWWA C151/A21.51; AWWA C104/A21.4 schedule 53, standard cement mortar lining, outside coated, unless otherwise shown on layout Drawings.
 - .2 Fittings - Mechanical: AWWA C110/A21.10, rated same as pipe. Fittings to be cement mortar lined and outside coated same as pipe.
 - .3 Fittings - Push-On: AWWA C110/A21.10, AWWA C111/A21.11, rated same as pipe. Fittings to be cement mortar lined and outside coated same as pipe.
 - .4 Joints:
 - .1 Mechanical Joints: AWWA C111/A21.11 as modified by AWWA C151/A21.51.
 - .2 Push-on Joints: AWWA C111/A21.11.
 - .3 Flanged Joints: AWWA C115/A21.15.
- .2 PVC Pipe:
 - .1 PVC Pipe and Fittings: SDR 21, with push-on joints.
 - .2 Joints:
 - .1 Push-On Joint Fittings: ASTM D3139, with ASTM F477 gaskets.
- .3 Bolts: The Contractor shall protect the bolts on all buried mechanical fittings. Bolts shall be protected from corrosion by using 20 mm zinc Cor-Cap nuts as supplied by Interprovincial Corrosion Control Company Limited, or approved equivalent.
- .4 Corrosion protection for all metal pipe, valves, fittings and bends to be polyethylene encasement to AWWA C105 / ASTM A674.

2.2 VALVES AND VALVE BOXES

- .1 Gate valves: standard buried type to AWWA C500 or AWWA C509 up to 300mm, minimum working pressure rating 1380kPa.
 - .1 Body: cast iron with mechanical joint ends for all buried gate valves.
 - .2 Mechanism: bronze mounted solid wedge, with resilient rubber seat and machined seating surface, epoxy coated, stainless steel nuts and bolts for bonnet and packing gland, non-rising spindle and O-ring seal.
 - .3 Direction to open: counter clockwise.
 - .4 Operating nut: 50.8 mm square.
 - .5 Internal and external epoxy coating, minimum 0.15 mm thick.
 - .6 Acceptable manufacturers: Clow, Mueller Canada, AVK.
- .2 Cast iron valve boxes: three piece sliding type adjustable over a minimum of 450 mm. Base to be large round type with minimum diameter of 300 mm complete with centering disc.
 - .1 Acceptable products: Bibby, Mueller MVB Composite Valve Box.
- .3 Anodes: cathodic protection will be provided to buried valves and fittings using sacrificial anodes.
- .4 Joint Restraint:
 - .1 Provide mechanical restraining glands on forcemain at tees, bends, main line gate valves and dead ends. Restraints to be ductile iron, wedge type for use with mechanical joint pipe.
 - .2 Acceptable products: Megalug as manufactured by EBAA Iron Sales Inc., Clow 300C Restrainer, Uni-Flange Series 1300.

2.3 BEDDING AND COVER MATERIALS

- .1 Pipe Bedding Material: Clear stone bedding material as described in Section 31 23 33 – Excavating, Trenching and Backfilling.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects to approval of Owner / Engineer. Remove defective materials from site as directed by Owner / Engineer.

3.2 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 33 - Excavating Trenching and Backfilling.

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- .2 Trench depth to provide cover over pipe of not less than 1800 mm from finished grade or as indicated.
 - .3 Trench alignment and depth require Owner / Engineer approval prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING

- .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 150 mm below bottom of pipe to depth as indicated.
- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to suit joints.
- .5 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling with compacted bedding material.

3.4 PIPE INSTALLATION

- .1 Maintain horizontal and vertical separation of force main from water main piping in accordance with NBDENV requirements.
- .2 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or
- .3 cables passed through pipe bore so that weight of pipe bears on pipe ends.
- .4 Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe.
- .5 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
- .6 Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .7 Position and join pipes with equipment and methods approved by Owner / Engineer.
- .8 Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .9 Align pipes carefully before jointing.
- .10 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

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- .11 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.
 - .12 Complete each joint before laying next length of pipe.
 - .13 Minimize deflection after joint has been made.
 - .14 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
 - .15 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Owner / Engineer.
 - .16 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
 - .17 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
 - .18 Do not lay pipe on frozen bedding.
 - .19 All ductile iron pipe and fittings are to be polyethylene encased (wrapped) meeting the requirements of the AWWA C105.

3.5 VALVE INSTALLATION

- .1 Install valves to manufacturer's recommendation at locations as indicated.

3.6 INSTALLATION - VALVE BOXES

- .1 Install valve boxes over each outside gate valve, unless otherwise indicated on layout Drawings. Center valve boxes over valve. Tamp fill around each valve box to a distance of 1.2 meter on each side or to undisturbed trench face, if less than 1.2 m.

3.7 THRUST BLOCKS AND RESTRAINED JOINTS

- .1 Place concrete thrust blocks between tees, plugs, caps, bends, hydrants and fittings and undisturbed ground as indicated or as directed by Owner / Engineer.
- .2 Keep joints and couplings free of concrete.
- .3 For restrained joints: Acceptable Product EBAA Iron Sales Inc., Clow, Uni-Flange.

3.8 TESTING PIPEWORK

- .1 Test pipework after backfilling.

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- .2 Fill forcemain, for testing. Pipeline to remain filled for not less than 24 hours prior to pressure test. Ensure all air is purged before starting pressure and leakage tests.
 - .3 Gradually increase water pressure inside pipe until it reaches 1034 kPa at the lowest location under test. Maintain pressure test for two hours.
 - .4 Measured leakage of water as measured by a water meter approved by the Owner / Engineer.

$$Q = LD \sqrt{P}$$

795,000

Where: Q = allowable leakage, in litres/hour.

L = length of pipe, m.

D = diameter of pipe, in millimeters.

P = average test pressure, in kilopascals.

- .5 The allowable leakage shall not be exceeded between adjacent valves.
- .6 Replace, at no cost to Contract, all pipes, valves, fittings and couplings which are defective. Perform test at no cost to Contract until pipeline is approved by Owner / Engineer.
- .7 Underground forcemain shall be flushed and shall be hydrostatically tested at 1034 kPa for 2 hours per testing watermain.
- .8 The civil contractor is responsible for all costs and fees associated with installation and testing of the forcemain for piping and fittings up to the Owner/supplied equipment.

3.9 TESTS TO BE REPEATED

- .1 Should tests disclose leakage, locate and repair defective pipes, or joints, to approval of Owner / Engineer.
- .2 Tests to be carried out, at Contractor's expense to determine success or otherwise of remedial measures applied to pipework. These tests to be repeated at Contractor's expense until results show that remedial measures have been successful.
- .3 Following acceptance of field tests, should the Owner / Engineer suspect the forcemain, for any reason, no longer complies with requirement of the test, they may order a second test and should the length of pipeline prove defective, Contractor shall repair or make good defect at their own expense.
- .4 Cost of this second test to be borne by Contractor if test proves a defect. However, if this second test shows pipe to be satisfactory, cost of second test will be borne by Owner / Engineer.
- .5 When testing is done during freezing weather, protect valves, joints and fittings from freezing.

3.10 PROTECTION

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- .1 Water is not permitted to run or stand in trench while pipe laying is in progress, before the joints are completely set, or before trench has been backfilled.
 - .2 Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Receiving, offloading, storing, setting, anchoring, connecting, field testing, and commissioning of the Owner-supplied packaged suction-lift pumping stations, and enclosures, complete and operational.
- .2 Installation of pre-engineered, prefabricated assemblies comprising pump(s), valve(s), internal piping, and controls.
- .3 Contractor-supplied appurtenances, connecting piping, pipe supports, thrust restraint, wet well penetrations, grounding, and site electrical connections required for a complete installation.
- .4 New wet wells (SLS#1 and SLS#3) and rehabilitation of existing wet well (SLS#2).

1.2 REFERENCE STANDARDS

- .1 ASME B16.1 – Gray Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, and 250.
- .2 ANSI/AWWA C110/A21.10 – Ductile-Iron and Gray-Iron Fittings.
- .3 ANSI/AWWA C115/A21.15 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- .4 ANSI/AWWA C151/A21.51 – Ductile-Iron Pipe, Centrifugally Cast.
- .5 ASTM C478M / CAN/CSA-A257 – Precast Reinforced Concrete Manhole and Structure Sections.
- .6 CSA C22.1 – Canadian Electrical Code, Part 1.
- .7 CSA C22.2 No. 108 – Liquid Pumps.
- .8 IEEE 112 – Standard Test Procedure for Polyphase Induction Motors and Generators.

1.3 RELATED REQUIREMENTS

- .1 Section 31 23 33 – Excavation, Trenching and Backfilling.
- .2 Section 33 05 16 - Precast Manholes and Structures.
- .3 Section 33 31 13 - Site Sanitary Sewerage Gravity Piping: Connections to sanitary sewer piping system.

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- .4 Section 33 31 23 - Sanitary Sewerage Force Main Piping. Connections to sanitary sewerage force main piping system.

1.4 **OWNER-SUPPLIED EQUIPMENT**

- .1 The Owner will supply the pumping systems for three (3) suction-lift pumping stations. The Owner-supplied equipment for each station includes two (2) horizontal self-priming suction-lift pumping units, V-belt drives, motors, internal pipes, valves and fittings, air-release valves, gauge kits, flow meter, discharge connections, the station enclosure, the motor control panel, and the pump control wiring / liquid level control system. This equipment is Owner-supplied under separate procurement and shall be installed by the Contractor under this Section.
- .2 All station duty points, materials of construction, pump performance, reprime performance, and equipment design requirements have been established under that procurement. The duty points established under that procurement are reproduced in Section 1.5 for coordination only.
- .3 The Contractor is responsible for receiving, offloading, storing, setting, levelling, anchoring, connecting, testing, commissioning, and placing into service the Owner-supplied package, complete with all Contractor-supplied appurtenances and structures required for a complete and operable installation, whether or not each item is expressly identified herein.
- .4 Confirm scope of supply and the division of responsibility between the equipment manufacturer's start-up services and the Contractor prior to commencing installation. Report any discrepancy between the delivered package and the Contract Documents to the Owner / Engineer before proceeding.

1.5 **STATION DUTY POINTS (FOR COORDINATION ONLY)**

- .1 The following duty points were established under the Owner's equipment procurement and are provided so the Contractor can coordinate connecting works, restraint, and testing. Values are for information only — confirm against the approved manufacturer's submittals:

Parameter	SLS #1	SLS #2	SLS #3
Capacity (L/s)	20.00	5.00	25.00
Total Dynamic Head (m)	26.57	3.72	15.90
Total Dynamic Suction Lift (m)	5.12	5.08	6.68
Maximum Repriming Lift (m)	3.17	3.78	4.93
Minimum TDH (m)	25.82	3.47	15.15
Maximum TDH (m)	26.57	3.72	15.90
Maximum Static Suction Lift (m)	3.62	4.08	5.68
Total Discharge Static Head (m)	1.36	-1.81	-1.98

Parameter	SLS #1	SLS #2	SLS #3
Minimum Submergence Depth (m)	0.75	0.75	0.75
Site Power	600/347 V, 3Ø, 4-wire	120/240 V, 1Ø, 3-wire	600/347 V, 3Ø, 4-wire

1.6 **SUBMITTALS**

- .1 See Section 01 00 00 - Administrative Requirements, for submittal procedures.
- .2 Installation Submittals: manufacturer's written installation, setting, and anchoring instructions supplied with the Owner-furnished package; rigging and offloading instructions; and start-up/commissioning procedures.
- .3 The Project Construction Sequence Plan is the responsibility of the Contractor and is to be provided to the Owner two (2) weeks prior to construction for review by the Owner and Engineer. The plan will clearly indicate how the operation of the existing stations are maintained throughout construction, when tie-ins to existing sewers and forcemains will occur, bypass pumping methodology, and timelines for critical tasks. The Contractor is responsible to prevent sanitary overflows from occurring during any tie-ins to existing sewers and forcemains, and is to collect and dispose of all wastewater generated within the catchments, at an approved location, while the connection is completed.
- .4 Site Security / Traffic Plan: submit a plan for temporary fencing, barricades, and maintenance of pedestrian and vehicle access, allowing one (1) week for the Owner's review and acceptance.
- .5 A copy of the approved manufacturer's submittal (pump curves, drive data, control schematics, enclosure drawings) transmitted with the equipment, is to be incorporated into the record documents. Do not re-submit for approval unless field conditions require a change.
- .6 Field Test Reports: signed reports for suction-line vacuum test, hydrostatic test of interior/connecting piping, reprime demonstration, and control/alarm function checks (see Part 3).
- .7 Manufacturer's Field Service Report: signed by the manufacturer's representative confirming correct installation, calibration, start-up, and operator training.

1.7 **DELIVERY, STORAGE, AND HANDLING**

- .1 Coordinate delivery with the Owner and the equipment manufacturer. Offload with equipment of sufficient size and design to prevent injury or damage, using the manufacturer's written rigging instructions and designated lifting points.
- .2 Immediately after offloading, inspect the complete station and appurtenances for shipping damage or missing parts, and validate serial numbers and parts lists against shipping documentation. Note any damage or shortage in a written claim with the shipper prior to accepting delivery, and notify the manufacturer's representative and Engineer.

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- .3 Handle and store pumps, pipe, valves, and fittings to avoid damage; do not pass chains or cables through pipe or equipment, and do not damage coatings or linings.
 - .4 If a pump is stored for two (2) months or more prior to use, rotate the pump impeller to avoid mechanical seal set/failure, in accordance with the manufacturer's instructions.

1.8 WARRANTY

- .1 The Owner-supplied packaged pumping station carries the manufacturer's warranty established under the equipment procurement. The Contractor shall perform all installation, use, and maintenance in accordance with the manufacturer's recommendations so as not to void that warranty.
- .2 A start-up report completed by an authorized manufacturer's representative must be submitted within the manufacturer's required period (thirty (30) days of the unit being placed in service) to activate/maintain the equipment warranty. The Contractor shall coordinate and facilitate this start-up.

1.9 SITE CONDITIONS AND CONSTRAINTS

- .1 Conduct the Work with as little disturbance as possible to existing property and municipal infrastructure. Protect existing roadways, parking lots, signage, and above-ground and underground utilities. Any repair or reconstruction required is incidental to the Work and shall be to the satisfaction of the Owner / Engineer.
- .2 Examine the site and determine any restrictions that may affect the Work prior to bidding. No claim will be entertained for additional costs arising from site conditions or restrictions.
- .3 Obtain and have in place all permits before commencing the Work; no claim will be considered for delays related to permit acquisition. Notwithstanding, order the long-lead installation materials immediately upon award.
- .4 Coordinate construction activities to maintain pedestrian and vehicle access throughout construction, and minimize disruption to the Owner and Residents. Confine construction activities associated with sewer interception and station construction to within the property limits shown on the Drawings.
- .5 Erect temporary security fencing or barricades around all work areas and each station site to separate construction traffic and workers from the public, in accordance with the accepted Site Security / Traffic Plan. Ensure all applicable codes and standards are met.
- .6 Carry out all Work in conformance with the New Brunswick Occupational Health and Safety Act and Regulations.

PART 2 - PRODUCTS

2.1 OWNER-SUPPLIED PACKAGED SUCTION-LIFT STATION

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- .1 Furnished by the Owner under separate procurement; installed under this Section. The package is a complete, factory-built, tested, and assembled base-mounted, above-grade, horizontal self-priming duplex suction-lift pumping station comprising, at minimum: pumps, V-belt drives and guards, TEFC motors, internal ductile-iron piping, check valves, isolation valves, automatic air-release valves, gauge kits, flow meter, station enclosure, motor control panel, and liquid level control system.
 - .2 Materials of construction, pump features, reprime performance, drive/motor selection, valve and control requirements, and enclosure construction are as established in the equipment procurement.
 - .3 Do not substitute, modify, or field-alter any component of the Owner-supplied package without the written approval of the manufacturer and the Engineer.

2.2 CONTRACTOR-SUPPLIED MATERIALS

- .1 Provide the following to complete the installation, matching the materials, pressure class, and standards of the connecting systems:
- .2 Suction and Discharge Connecting Piping: ductile iron to ANSI/AWWA C151/A21.51, Class 53; flanges to ASME B16.1, Class 125; jointing and fittings as specified for the connecting sanitary sewer / force main. Coordinate sizes, elevations, and orientation with the station connections shown on the approved submittals and the Drawings.
- .3 Suction Piping Requirements: airtight/vacuum-tight joints; arrange to be self-draining toward the wet well with no high points or air pockets; minimum practical length and fittings. Confirm suction pipe size equals the station suction connection.
- .4 Pipe Supports and Thrust Restraint: supports, hangers, and thrust blocks so that no piping load is transmitted to the station or its piping; anchor discharge/force main piping with thrust restraint where shown on the Drawings.
- .5 Wet Well Penetrations: circular cored or cast openings:
 - .1 Sealed with a modular elastomer (link-seal type) sealing system in accordance with the manufacturer's recommendations; grout the exterior face of penetrations.
 - .2 Ductile iron, flanged spool pieces complete with an integral waterstop flange to be Cast-in-place.
- .6 Anchor Bolts / Grout: stainless-steel anchors and non-shrink grout as required by the manufacturer's setting details; provide isolation bushings between stainless-steel anchors and dissimilar materials.
- .7 Site Electrical: power feed conductors and conduit to the control panel branch breakers, an earth-driven grounding electrode connection to the station main grounding lug per CSA C22.1, and final connections to remote alarm/telemetry devices. Site power information is listed in Section 26 05 00.
- .8 Temporary Bypass Equipment: bypass pumps, suction/discharge hosing, plugs, and vacuum trucks (vac-trucks) as required to intercept, contain, and convey wastewater during tie-in outages, in accordance with Section 3.2.

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- .9 Miscellaneous: potable water, temporary power, gauges, and appliances required for field testing and flushing.

2.3 WET WELL CONSTRUCTION

- .1 Provide leak-free precast reinforced concrete wet well / cover structures with access openings and hatches where indicated, to ASTM C478M / CAN/CSA-A257 and Section 33 05 16. Cast-in-place concrete may be used in lieu of precast where indicated or approved by the Engineer.
- .2 Design each structure for the following, in combination as applicable:
- .1 Dead load of the station and its components, together with the dynamic and kinetic forces of the rotating equipment.
 - .2 Dead load of soil over the structure and a superimposed live load of 12 kN/m², or a single wheel load of 54 kN over an area of 750 × 750 mm, whichever governs.
 - .3 Hydrostatic uplift forces.
 - .4 Horizontal earth loading together with full hydrostatic pressure, assuming water at ground elevation.
- .3 Provide wet well penetrations, bedding, and backfill in accordance with Clause 2.2 and Section 31 23 33. Confirm inlet and discharge connection sizes, elevations, and orientation against the approved equipment submittals before casting or setting.

2.4 CONTROL FUNCTIONS AND INSTRUMENTATION

- .1 Automatic Controls: Pump control panel is supplied by AFNWA. Coordinate installation requirements with AFNWA. Install controls as indicated and in coordination with AFNWA supplied panel. The information below may be subject to change based on final Control Panel design layout.
- .1 Provide manual controls as indicated.
 - .2 Provide remote indication corresponding to all local indication.
 - .3 Provide remote controls corresponding to all manual controls.
- .2 Pump Controls: Pump control panel is supplied by AFNWA. Coordinate installation requirements with AFNWA.
- .1 Pump Actuators: Two float-operated water level switches, one float set at low-water level and one at high-water level. Install as indicated on the drawings.
 - .2 Pump Actuator.
 - .3 When low-water level is exceeded, start the Lead pump.
 - .4 Each time low-water level is reached, set the other pump as Lead.
 - .5 Operate both pumps if water level rises above high-water level.
 - .6 Prevent both pumps from starting at the same time.
 - .7 Include time delay devices so that pumps cannot be started within a certain period after shutdown, adjustable from 10 to 120 seconds.
 - .8 Stop both pumps when low-water level is reached.
 - .9 Provide Hand-Off-Auto switches for each pump.

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- .10 If one pump is disabled, switch operation to other pump.
 - .11 Include alarm to warn of failure of pumps.
 - .3 Pump Controls: Provide float-operated water level switch to start and stop pump.
 - .1 When water level rises above low-water level, start pump.
 - .2 Stop pump when low-water level is reached.
 - .4 Float Type Water Level Sensors: Direct acting float switch consisting of normally-open mercury switch enclosed in tear-drop shaped float designed to tilt and operate switch sending signal; 12 volts DC.
 - .1 Pump Control Float Switches: Connected to pump controller.
 - .2 Emergency High Level Float Switch: Connected to alarm contact of battery charger to activate alarm.
 - .3 Float: Molded, rigid high-density polyurethane foam, colour-coded and coated with durable, water and corrosion-resistant jacket of clear urethane.
 - .4 Mounting: Pole-mounted with connecting power cable.
 - .5 Junction Box: Cast aluminum NEMA Type 4, with gasketed cover and tapped float fitting and pipe threaded conduit entrance opening.
 - .6 Mount floats at elevations indicated.
 - .5 Ultrasonic level sensors.
 - .1 Pre-selected and supplied by AFNWA.
 - .6 Emergency High Level Alarm: Float-operated water level switch independent of pump control; set at emergency high-water level; activating alarm indicators.
 - .7 No-Flow Switches: Limit switch at check valve; indicator light; activating alarm indicators.

2.5 **POWER**

- .1 Electrical Power Available: As indicated on Drawings.
- .2 Wiring and Conduit: Meet or exceed requirements of CSA C22.1.
- .3 Control Wiring: 18 AWG, minimum, in plastic wireway with snap-on cover, bundled and tie wrapped neatly.
- .4 Control Panel: (Provided by AFNWA) NEMA 4X stainless steel construction, with hinged door and hinged dead front; sized to accommodate all components; factory wired and tested.
 - .1 Internal Wiring: Stranded copper conductors rated at 90 degrees Celsius, with conductor terminations as recommended by device manufacturer.
 - .2 Mounting: Wall mounted, suitable for mounting on strut or channel.
 - .3 Door: Minimum 180 degrees opening, rubber gasket weatherproof seal, 3-point latch, and padlockable handle.
 - .4 Dead Front: Minimum of 150 degrees opening.
 - .5 Back Plate: Steel sheet, 2.66 mm thick, minimum; finished with primer coat and two coats of baked on white enamel.

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- .6 Hardware Mounting: Use machine screws in thread-tapped holes; sheet metal screws not permitted.
 - .7 Ventilator: Rain and vermin proof ventilator of fire retardant thermoplastic, located near top of enclosure on opposite side from receptacle.
 - .8 Permanently identify all devices as they are indicated on final as-built Drawings; identify on front of door, front of dead front, and on back plate.
 - .9 Identify all control conductors with wire markers at each end as close as practical to end of conductor.
- .5 Provide the following, at minimum, mounted on or in panel door:
- .1 Alarm indication.
 - .2 Identification Plate: Engraved to show uppercase white letters on black background, reading:
 - .1 "LIFT STATION CONTROL PANEL" and ID number as indicated on drawings.
 - .2 System voltage and phase.
- .6 Circuit breakers: as indicated on the drawings and compatible with preselected equipment.
- .7 Motor Overload Protection: Melting alloy type thermal overload relays; interchangeable and sized in accordance with CSA C22.1.
- .8 Control Transformers: Fused transformers and grounded secondaries.
- .9 Surge Protection: Provide incoming power solid state devices with LED indicator lights for power and protective status.
- .1 Line Side: Lightning surge arresters complying with IEEE C62.11.
 - .2 Load Side: Transient voltage surge suppression complying with CSA C22.2 No. 269.1.
 - .3 Rating: 50,000 amps per phase with response time less than 5 nanoseconds.
- .10 Power Monitor: Line voltage rated, solid-state, adjustable, plug-in monitor to sense reversed or loss of a phase, de-energizing upon sensing any faults and automatically restoring service upon return to normal power; activate alarm indications upon loss of normal power.
- .11 Alarm Indicators: Alarm light and horn mounted on exterior of power enclosure.
- .1 Light: Weatherproof and shatterproof red strobe alarm light fixture rated at 100,000 peak candle power, 80 flashes per minute.
 - .2 Horn: Not less than 90 dB at 3 meter.
 - .3 Power Supply: 12 volts DC, with battery backup rated for 7 amp-hours, minimum.
 - .4 Battery: Rechargeable, with plug-in base charger, solid state circuitry; automatically recharge after restoration of main power; full charge requiring maximum of 20 hours.
 - .5 Push-to-test button for light and horn, power-on light.

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- .6 Controls: Manual alarm silence switch that deactivates horn but leaves light flashing until alarm condition ceases to exist; when alarm condition ceases to exist reset alarm function for normal operation.
 - .7 Remote Monitoring and Alarm Indication: Provide one normally open and one normally closed unpowered contacts for remote monitoring and alarm indication, wired to terminal strip.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verify existing conditions before starting work. Report discrepancies to the Owner / Engineer.
- .2 Verify inlet and discharge piping connection match size, location, and elevation shown on Drawings.

3.2 EXISTING FACILITIES, SHUTDOWNS AND BYPASS PUMPING

- .1 The existing pumping stations 1 and 3 shall remain in service, fully operational, and accessible throughout construction of the new stations. New work shall be carried out alongside the operating stations with minimal disruption to continuous wastewater conveyance.
- .2 SLS #2 requires the existing wet well to be reused. Before the existing station is taken out of service, install, test and commission a temporary bypass pumping station with its own control panel and temporary power. Operate and maintain it 24/7 for the full duration of SLS #2 work until the new station has passed 3.7 testing and the 7-day operating period.
- .3 Bypass capacity: not less than 5 L/s at 4.0 m TDH, automatic float level control, a high-level alarm with remote notification to the Contractor and AFNWA, and a stated emergency response time.
- .4 Demonstrate bypass operation, including transfer to the standby pump and alarm function, in the presence of the Engineer before isolating the existing station.
- .5 Submit the bypass plan per 1.6, covering equipment, curves, hose routing, temporary forcemain connection, etc., power or fuel supply, noise control and spill response.
- .6 Install, commission and operate of a temporary bypass pumping station control panel including new temporary power, to be operated by the Contractor throughout the duration of the works for SLS#2.
- .7 During any outage, the Contractor is responsible to prevent any sanitary sewer overflow or discharge to the environment. Provide continuous bypass pumping and/or collect, contain, and haul all wastewater generated within the catchment by vacuum truck (vac-truck) to an approved disposal location at approved disposal location, until the connection is complete and the station is returned to service.

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- .8 Drain the existing force main at the existing station as required to complete the tie-in and manage all drained contents without discharge to the ground or watercourse.
 - .9 Confine all construction activities associated with sewer interception and station construction to within the property limits shown on the Drawings. Coordinate all outages and bypass operations with the Owner and Engineer.
 - .10 Each station is to be operated for one week by the Contractor to confirm normal automatic operation before demobilizing existing station equipment.

3.3 INSTALLATION

- .1 Excavate, backfill, and compact for the lift stations in accordance with Section 31 23 33, and construct the precast concrete wet well / pump enclosure structures in accordance with Clause 2.3 and Section 33 05 16.
- .2 Install, level, align, anchor, and lubricate the pumping station as shown on the Drawings and strictly in accordance with the manufacturer's written instructions supplied at time of delivery. Where components are mounted on concrete, wait a minimum of 5 days after concrete placement before setting/testing, and grout attachments before connecting piping.
- .3 Back-prime all metal surfaces mounted directly against concrete with bituminous paint, except surfaces to be grouted in. Install isolation bushings between stainless-steel anchors and dissimilar materials.
- .4 Seal each pipe-to-base joint with suitable grout during installation to prevent entrance of hazardous gases from the wet well into the enclosure.
- .5 Set liquid-level control elevations (pump start and stop, high- and low-level alarms) as indicated. Install and secure all service lines (level control, air-release, and pump drain lines) in the wet well.
- .6 Attach the manufacturer's as-built control/wiring and nameplate data inside the station, and post the operating instructions/legends as furnished with the package.

3.4 PIPE INSTALLATION AND CONNECTIONS

- .1 Examine pipe and appurtenances for defects and remove dirt/debris before installation. Temporarily support pipe during assembly so no strain is transmitted to the station.
- .2 Flanged joints: clean flanges, use full-face gaskets, lubricate, and tighten diametrically opposed bolt pairs simultaneously. Confirm suction connections are vacuum-tight and all pipe fasteners are tight.

3.5 ELECTRICAL CONNECTIONS

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- .1 Complete all electrical installations to meet or exceed CSA C22.1 and the local authority having jurisdiction. Provide only the power feed, grounding, and final alarm connections; the station internal wiring is furnished by the manufacturer.
 - .2 Check motor and control data plates for compatibility with site voltage. Install and test the station ground before connecting line voltage to the control panel.
 - .3 Before applying power, check all wiring for tight connections, verify protective devices conform to the design, manually operate breakers/switches for free operation, and verify line voltage, phase sequence, and ground before start-up.

3.6 MANUFACTURER FIELD SERVICES AND START-UP

- .1 Coordinate and pay for the services of the equipment manufacturer's technical representative to inspect the completed installation, calibrate and adjust instrumentation, direct start-up, correct or supervise correction of defects, and instruct the Owner's personnel in operation and maintenance.
- .2 Provide a written report signed by the manufacturer's representative confirming a satisfactory installation, readiness for permanent operation, that O&M instructions have been presented to the Owner, and that equipment has been properly lubricated.

3.7 TESTING AND COMMISSIONING

- .1 Advise the Owner / Engineer in writing at least one (1) week before testing and start-up. Provide all tools, materials, water, and equipment for testing, and conduct all tests in the presence of the Owner / Engineer. Where components are mounted on/in concrete, wait a minimum of 5 days after concrete placement before testing.
- .2 Suction-Line Vacuum Test: test suction lines for air leaks and confirm the suction piping maintains a continuous vacuum of up to 30 mm Hg (4 kPa).
- .3 Hydrostatic Test of Piping: gradually increase water pressure in the connecting/interior pipework to a minimum of 690 kPa or 1.5 times working pressure, whichever is greater, and hold for 15 minutes with no leakage.
- .4 Prior to starting the pumps, remove the plug or cap from the forcemain in the receiving manhole.
- .5 Reprime Demonstration: with the station in the reprime condition, demonstrate that a completely empty suction line reprimed to full pumping within a maximum of five (5) minutes at the selected speed and impeller diameter. Confirm reprime lift against the manufacturer's certified data; the published, dated, and certified reprime lift shall be provided upon request.
- .6 Operate each pump with water (or the pumped medium) long enough to confirm proper installation and alignment, free from heating, rubbing, or vibration, and that piping is free of debris and obstructions.

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- .7 Simulate varying wet-well levels to confirm level controls, pump alternation, and time-delay/anti-simultaneous-start functions operate correctly. Activate each control and alarm function (high-level, low-level, seal/thermal, phase/power monitor, no-flow) to confirm correct connection and operation.
 - .8 Demonstrate operation of all valves; confirm the isolation and check valves operate smoothly and that pumps can be isolated/removed. Observe wet well and valve piping during operation for leaks or loose connections and repair as required.
 - .9 Test pump flow against the specified pump curves by draw-down test or flow meter, or as directed by the Engineer.
 - .10 Correct all defects to the satisfaction of the Owner/Engineer and repeat tests until the equipment is in proper working order. After connecting to the sewer piping, monitor operation for 7 days and submit a report.,

3.8 CLEANING AND PROTECTION

- .1 Prior to acceptance, inspect the interior and exterior of the station for dirt, splashed material, or damaged paint; clean or repair accordingly. Remove all tools, surplus material, scrap, and debris from the site.
- .2 Place the station into service immediately. If operation is delayed, drain water from pumps and piping, open motor circuit breakers, and protect controls and interior equipment from cold and moisture per the manufacturer's written instructions.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA C22.2 No. 211.2 - Rigid PVC (Unplasticized) Conduit; 2026.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 10 00.
- .2 Submit WHMIS SDS - Safety Data Sheets acceptable to Labour Canada and Health and Welfare Canada for solvent cement. Indicate VOC content.

PART 2 - PRODUCTS

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: to CSA C22.2 No. 211.2, with moulded fittings, for direct burial.
- .2 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .3 Rigid PVC 90° and 45° bends.
- .4 Rigid PVC 5° angle couplings.
- .5 Expansion joints where conduits exit ground.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

- .1 6 mm stranded polypropylene pull rope, tensile strength 5 kN, continuous throughout each duct run with 3 meter spare rope at each end.

2.4 MARKER TAPE

- .1 Refer to Section 31 23 10 for marker tape.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install duct in accordance with manufacturer's instructions.
- .2 Clean inside of ducts before laying.
- .3 Confirm full, even support every 1.5 meter throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 During construction, cap ends of ducts to prevent entrance of foreign materials.
- .6 Pull through each duct mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 In each duct install pull rope continuous throughout each duct run with 3 meter spare rope at each end.
- .8 Install marker tape as specified in Section 31 23 10.

END OF SECTION