



**City of Charlottetown  
Seaview Boulevard Street  
Reconstruction  
File No. 2024-001**

**Technical Specifications**

**Specification Set No. \_\_\_\_\_**

**exp Project Number**  
MON-23000679-A0

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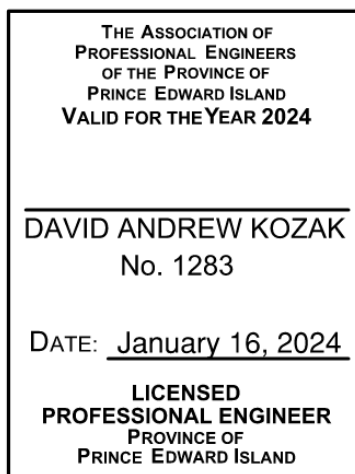
**Date**  
January 2024

**Part 1 - General**

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**END OF SECTION**



**Part 1        General**

**1.1            DESCRIPTION OF WORK**

- .1        The Work generally includes the reconstruction of Seaview Boulevard from North River Road to Atlantic Road. Work on this project consists generally of, but not limited to, the following:
- .1        Removals and disposal.
  - .2        Environmental protection.
  - .3        Watermain replacement.
  - .4        Sanitary sewer renewal.
  - .5        Storm sewer renewal and catch basin installation.
  - .6        Service renewals.
  - .7        Accommodating existing infrastructure.
  - .8        Common excavation.
  - .9        Concrete curb and sidewalk installation.
  - .10      Granular placement and pavement structure construction.
  - .11      Asphalt paving;
  - .12      Reinstatement; and
  - .13      Traffic control.

**1.2            LIST OF DRAWINGS**

<b>DRAWING NO.</b>	<b>TITLE</b>
	Cover Sheet
4-1	Seaview Blvd Plan and Profile – STA 1+000 to 1+150
4-2	Seaview Blvd Plan and Profile – STA 1+150 to 1+300
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4-4	Hunt Ave Plan and Profile – STA 2+000 to 2+045 & Typical Sections
4-5	Cross Sections
4-6	Construction Notes and Details

**END OF SECTION**

**Part 1      General**

- .1 A complete Tender is comprised of the following:
  - .1 The Tender Form in its entirety, with all pages and spaces for entry of information by Tenderers filled in as instructed.
  - .2 Addenda received by the Tenderer during the tendering period.
  - .3 Tender Security (refer to Clause 13 herein).
- .2 The tender shall be submitted in a sealed envelope marked as follows:

TENDER FOR

**City of Charlottetown**  
**Seaview Boulevard Street Reconstruction**  
**File No. 2024-001**

and must be delivered to the following address up until **2:00:00 p.m., local time, on February 5, 2024**, hereinafter referred to as the Tender Closing.

Finance Department  
3<sup>rd</sup> Floor City Hall  
199 Queen Street  
Charlottetown, PE C1A 4B7

- .3 Tender opening will occur immediately following tender closing. Tender opening will be public.
- .4 Before tendering, Tenderers should have examined the site of the work and shall have satisfied themselves as to the working conditions, including labour conditions and labour rules, the nature and kind of work to be done, any special risks associated therewith and all other matters which may be necessary in order to form a proper conception under which the work will be required to be performed. Tenderers shall not be entitled to claim at any time after execution of the Contract that there was any misunderstanding in regard to all such conditions.
- .5 The Tenderer shall be deemed to have satisfied itself before submitting a Tender as to the correctness and sufficiency of the Tender and the prices entered in the Tender Form, and such prices shall be deemed to cover and include all obligations under the Contract.
- .6 When forming their estimates and preparing their tenders, Tenderers shall take full cognizance of the content of all the Contract Documents listed in Section

00 41 43 – Tender Form.

- .7 Any questions, ambiguities, inconsistencies, or uncertainties in the Contract Documents which may become apparent to Tenderers when tendering shall be sent IN WRITING to: [tenders@charlottetown.ca](mailto:tenders@charlottetown.ca), not less than three (3) working days before Tender closing. Tenderers will be advised simultaneously of any decisions on such matters as necessary by means of addenda (which will be serially numbered) and posted on the City's website; [www.charlottetown.ca/tenders](http://www.charlottetown.ca/tenders). All addenda issued shall be incorporated into the Contract Documents. **It is the responsibility of the Tenderer to ensure all addenda have been received.**
- .8 The Tenderer shall fill in the Completion Time and is notified that the completion date based on this may be taken into account in considering the tenders.
- .9 All tenders shall be valid for acceptance for sixty (60) calendar days from the Closing Date.
- .10 The Agreement is included in the Contract Documents at the time of tendering only for information and shall not be completed at the time of tendering.
- .11 The appending of any qualifying clauses to the tender or failure to comply with these instructions and with all other relevant provisions contained in the documents in the completing of any tender renders such tender liable to disqualification.
- .12 Contract Price to exclude HST. Harmonized sales tax shall be indicated as a separate amount and included in the Total Amount Payable.
- .13 Each tender shall be accompanied by Tender Security in the amount of ten percent (10%) of the Total Amount Payable in evidence of the bona fide nature of the tender. This Tender Security shall be in favour of the Owner and shall be in the form of a Certified Cheque, irrevocable Letter of Credit or a Bid Bond which 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.
  - .1 The bonds shall be issued by a company whose guarantee bonds are acceptable to the Government of Canada. Use latest edition of CCDC Form 220.
- .14 The City of Charlottetown and EXP Services Inc. are to be added to all insurance policies as an "Additional Insured".
- .15 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 is the sooner.
- .16 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 following receipt of a written notice of acceptance from the Owner. The written

- 
- notice of acceptance forms a Contract Agreement until the formal "Agreement" is executed.
- .17 Within seven (7) days of written acceptance of a tender that tender shall provide Contract Security in the amount and form as specified in GC 11.2 and as supplemented in Section 00 73 00, and Insurance as specified in GC 11.1.
- .18 Complete the Tender Form in ink and have corrections initialled by the individual signing the tender.
- .19 Where manufactured articles are described or specified in the Contract Documents by name, catalogue number of a manufacturer or supplier, Tenderers shall tender on the basis of using only such articles. Procedure concerning substitution of a specified article with another shall be in accordance with equivalents and alternates in Section 01 10 10 – General Instructions.
- .20 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.
- .21 The Owner reserves the right to accept or to reject any or all tenders received, or to select a tender which is deemed by the Owner to be in its best interests, based on evaluation of relevant criteria, including quality, service and price.
- .1 City Council shall make the decision as to whether or not a contract shall be awarded and to whom it will be awarded.
- .22 Tenders will be evaluated based on compliance with the specification, information submitted with the quotation, cost, completion time, experience and other factors, which may affect the overall cost and performance of the final product.
- .23 Submissions will not be evaluated if the Tender's current or past corporate or other interests may, in the City's opinion, give rise to a conflict in connection with this project.
- .24 At the election of the City, whether or not a bid or tenderer otherwise satisfies the requirements of the Tender, the City may reject summarily any tender received from a corporation or other person which has been anywhere involved in litigation, arbitration or alternative dispute resolution with the City within the five (5) year period immediately preceding the date on which the Tender was published.
- .25 The City's evaluation may include information provided by the Tender's references and may also consider the tender's past performance on previous contracts with the City or other institutions.
- .26 The City may prohibit a tenderer from participating in a procurement process based on past performance or based on inappropriate conduct in a prior procurement process, and such inappropriate conduct shall include but not be limited to the following: (a) the submission of tenders containing misrepresentations or any other inaccurate, misleading or incomplete information; (b) the refusal of the tenderer to honour its pricing or other commitments made in its tender; or (c) any other conduct, situation or circumstance, as solely determined by the City.

- .27 Any potential conflict of interest must be disclosed to the City in writing. Any conflict of interest identified will be considered and evaluated by the City. The City has the sole discretion to take the steps they deem necessary to resolve the conflict. If, during the term of the Contract, a conflict or risk of conflict of interest arises, the Contractor will notify the City immediately in writing of that conflict or risk and take any steps that the City reasonably requires to resolve the conflict or deal with the risk.
- .28 Charlottetown may, by written notice to a tenderer, cancel any contract if it is found by the City that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the tenderer, or the agent or representative of the tenderer, to any employee or agent of the project with a view toward securing favourable treatment with respect to the awarding or amending, or making any determinations with respect to performing of such contract.
- .29 Tenders, which in the opinion of the Owner are considered to be informal or unbalanced, may be rejected.
  - .1 For the purpose of this Section, an unbalanced tender is a tender containing a unit price which deviates substantially from, or does not fairly represent reasonable and proper compensation for the unit of work bid or one that contains prices which appear to be so unbalanced as to adversely affect the interests of the City. The City reserves the right to use tenders submitted in response to this Request for Tender or for other like or similar work as a guideline in determining if a bid is unbalanced.
- .30 A Tenderer who has already submitted a tender may submit a further tender at any time up to the official closing time. The last submission received shall supersede and invalidate all submissions previously submitted by that tenderer for this Tender. Any tenderer may withdraw or qualify his/her submission at any time up to the official closing time by re-submitting a new tender to the City. The time and date of receipt will be marked thereon and the new submission will be placed in the tender box. The new submission shall be marked on the sealed envelope by the Tenderer as "Resubmission #" along with the name of the Tender and to the attention of the Finance Department, as noted above in the Tender. Tenders may be withdrawn at any time prior to opening upon written request from the tenderer. Negligence on the part of the tenderer in preparing his/her bid shall not constitute a right to withdraw a tender subsequent to the tender opening.
- .31 The project budget is sensitive and following the close of tenders and prior to award, it may be necessary to adjust the scope to match available dollars.



- .32 Over-Budget Bids:
  - .1 If the Tender Price of the lowest compliant Tender exceeds the City's project budget or the Engineer's Estimate for the Project, the City may proceed with negotiations with the lowest compliant Tenderer. Said negotiations shall be conducted within a prescribed timeframe to identify changes in scope and/or quantities of work, in exchange for a corresponding bid price reduction. Where the City and lowest compliant Tenderer establish acceptable changes and a corresponding bid price reduction, those changes shall be documented as post-bid addendum.
  - .2 Any such negotiations or resulting recommendations shall be conditional and subject to the approval of City Council and, in accordance with the Limitation of Liability and Waiver set out below, there shall be no liability resulting from any failure to award a contract.
  - .3 Where acceptable changes and a corresponding bid price reduction cannot be successfully negotiated with the lowest compliant Tenderer, the City may proceed with a new tender call at a later date.
- .33 Limitation of Liability and Waiver:
  - .1 Each Tenderer, by submitting a Tender, agrees that:
    - .1 Neither the City nor any of its employees, agents, advisors or representatives will be liable, under any circumstances, for any Claim arising out of this Tendering Process including but not limited to costs of preparation of the Tender, loss of profits, loss of opportunity or for any other Claim; and
    - .2 The Tenderer waives any Claim for any compensation of any kind whatsoever, including Claims for cost of preparation of the Tender, loss of profit or loss of opportunity by reason of the City's decision to not accept the Tender submitted by the Tenderer, to award a Contract to any other Tenderer or to cancel this Tendering Process, and the Tenderer shall be deemed to have agreed to waive such right or Claim.
- .34 Tenderers are advised that the City of Charlottetown uses electronic payments for goods and services provided to the City. Payment of invoices will be made by way of Electronic Funds Transfer. The successful tenderer will be required to provide the necessary banking information for registration on the City's system.
- .35 A Cash Allowance has been included in Section 00 41 43 – Tender Form to cover additional costs that may occur during the execution of the Contract attributed to approved additional work not originally contemplated. No part of this allowance shall be expended without the written direction of the Owner's Representative, and any part not so expended shall be deducted from the contingency allowance.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**1. SALUTATION:**

- .1 To: City of Charlottetown  
\_\_\_\_\_  
\_\_\_\_\_
- .2 For: Seaview Boulevard Street Reconstruction  
File No. 2024-001  
\_\_\_\_\_
- .3 From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2. TENDERER DECLARES:**

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

**3. 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 unit prices stated in Subsection 4 hereunder, Schedule of Quantities and Unit Prices.
- .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 the time of Tender Closing.
- .4 That measurement and payment for Items listed in Subsection 4 hereunder shall be in accordance with corresponding Items in Section 01 29 00 – Payment Procedures.
- .5 To provide evidence of ability and experience within 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. This information will be taken into consideration at the time of Contract

Award.

- .6 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.
- .7 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.
- .8 That if certified cheque is forfeited, Owner will retain difference in money between amount of Tender and amount for which Owner legally contracts with another party to perform the Work and will refund balance, if any, to Tenderer.
- .9 That the Contract Documents include:
  - .1 Description of Work and List of Drawings
  - .2 Instructions to Tenderers
  - .3 Tender Form
  - .4 Supplementary Tender Information
  - .5 Standard Construction Contract
  - .6 Supplementary General Conditions
  - .7 Supplementary Specifications
  - .8 Addenda as issued and as confirmed in Subsection 2.4 of this Section.

#### 4. SCHEDULE OF QUANTITIES AND UNIT PRICES

ITEM	DESCRIPTION	UNIT	QTY.	UNIT PRICE	AMOUNT
<b>Seaview Boulevard Street Reconstruction</b>					
1.1	Precast Structures				
	.01 750mm dia. Catch Basin	ea	17		
	.02 1050mm dia. Catch Basin / Manhole c/w Grated Frame and Cover	ea	2		
	.03 1050mm dia. Storm Manhole c/w Adjustable Frame and Cover	ea	8		
	.04 1050mm dia. Sanitary Manhole c/w Adjustable Frame and Cover	ea	7		
	.05 Replace Existing Sanitary Manhole Sections and Reuse Existing Frame and Cover	LS	1		
1.2	Supply and Install Storm Sewer				
	.01 150mm dia. Catch Basin Lateral	m	110		
	.02 200mm dia. Catch Basin Lateral	m	18		
	.03 300mm dia. Storm Sewer	m	65		
	.04 375mm dia. Storm Sewer	m	360		
1.3	Supply and Install Sanitary Sewer				
	.01 100mm dia. Sanitary Lateral	m	240		
	.02 150mm dia. Sanitary Lateral	m	15		
	.03 200mm dia. Sanitary Sewer	m	420		
1.4	Supply and Install Watermain				
	.01 200mm dia. PVC DR18 Watermain	m	430		
	.02 200mm dia. Tapping Sleeve and Valve	ea	1		
	.03 200mm dia. Watermain Fittings, Including All Appurtenances	ea	4		
	.04 200mm dia. Gate Valve	ea	3		
	.05 Fire Hydrant (Complete)	ea	3		

	.06 25mm Dia. Water Service Lateral	m	275		
	.07 25mm Dia. Water Service Appurtenances	ea	25		
1.5	Common Excavation	m <sup>3</sup>	4,400		
1.6	Geogrid (Provisional)	m <sup>2</sup>	1,000		
1.7	Select Borrow	t	3,900		
1.8	Class 'A' Granular	t	2,150		
1.9	Concrete Barrier Curb				
	.01 Barrier Curb	m	110		
	.02 Barrier Curb and Gutter	m	815		
1.10	Concrete Sidewalk				
	.01 1.5m Wide Integral Curb/Sidewalk	m <sup>2</sup>	30		
	.02 1.5m Wide Sidewalk	m <sup>2</sup>	635		
1.11	Type 'A' Base Asphalt (60mm thickness)	t	715		
1.12	Type 'B' Seal Asphalt (40mm thickness)	t	475		
1.13	Type 'A' Base Asphalt (40mm thickness) for Driveway Restorations	t	75		
1.14	Type 'B' Seal Asphalt (25mm thickness) for Driveway Restorations	t	75		
1.15	Select Borrow (300mm thickness) for Driveway Restorations	t	400		
1.16	Class 'A' Granular (150mm thickness) for Driveway Restorations	t	215		
1.17	Tactile Warning Surface Indicators	ea	6		
1.18	Unit Paver Driveway Restoration	m <sup>2</sup>	20		
1.19	Topsoil & Sod	m <sup>2</sup>	2,900		
1.20	Utility Allowance	allow	1	\$50,000	\$50,000
1.21	Cash Allowance	allow	1	\$75,000	\$75,000

1.22	Tree Protection (Provisional)	allow	1	\$35,000	\$35,000
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**Seaview Boulevard Street Reconstruction – Net Amount** \$

**Add 15% HST** \$

**Total Contract Price** \$

Tenderers are asked to provide tender prices for all sites and to complete the above summary at the time of tendering. Tender will be evaluated on the basis of Total Contract Price.

#### TAXES

Tenderer's HST Registration Number \_\_\_\_\_

#### 5. COMPLETION TIME

Tenderer agrees to start on-site construction by \_\_\_\_\_, 2024, and achieve Substantial Performance of the work by **August 30, 2024**.

The schedule includes for the following working days per site:

Seaview Boulevard Street Reconstruction \_\_\_\_\_ days

Bidders are advised that the anticipated contract award date by Council is February 13<sup>th</sup>, 2024. This date is approximate and may change. Construction schedules for the work shall not start before April 1<sup>st</sup>, 2024.

**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.

**END OF SECTION**



**1. Referee as to the Tenderer's financial status:**

Name: \_\_\_\_\_

\_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Contact: \_\_\_\_\_ Telephone: \_\_\_\_\_

**2. Name and address of company who has agreed to underwrite the Bonds for Performance and for Labour and Material Payment. Refer to Clause GC 11.2 – Contract Security in the General Conditions.**

Name: \_\_\_\_\_

\_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

**3. Name and address of company who has agreed to underwrite insurance on this Contract and the type and amount of insurance. Refer to Clause GC 11.1 – Insurance in the General Conditions.**

Name: \_\_\_\_\_

\_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Type of Insurance

Amount

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**4. Particulars of Tenderer's recent contracts:**

The Tenderer shall furnish particulars of at least three, and if possible, five contracts successfully completed or currently being carried to completion. The projects quoted should preferably be approximate in nature to the Works now tendered for and be of comparable or greater size.

1. (a) Owner: \_\_\_\_\_

(b) Project Description: \_\_\_\_\_  
\_\_\_\_\_

(c) Start Date: \_\_\_\_\_ Finish Date: \_\_\_\_\_

(d) Contract Value: \$ \_\_\_\_\_

2. (a) Owner: \_\_\_\_\_

(b) Project Description: \_\_\_\_\_  
\_\_\_\_\_

(c) Start Date: \_\_\_\_\_ Finish Date: \_\_\_\_\_

(d) Contract Value: \$ \_\_\_\_\_

3. (a) Owner: \_\_\_\_\_

(b) Project Description: \_\_\_\_\_  
\_\_\_\_\_

(c) Start Date: \_\_\_\_\_ Finish Date: \_\_\_\_\_

(d) Contract Value: \$ \_\_\_\_\_

**5. List of equipment to be used on this project.**

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**6. Tentative program of works:**

The Tenderer shall attach hereto a Gantt chart showing the proposed schedule to ensure completion by the Substantial Performance Date set forth in the Tender Form.

[illegible]

7. List of Sub-Contractors to be used:

The Tenderer's attention is drawn to the General Conditions GC 3.8 – Subcontractors and Suppliers. The Tenderer shall enter the name and address of each Sub-Contractor used in making up the tender. Only one Sub-Contractor shall be named for each part of the work to be sublet.

After the tender has been accepted by the Owner, the Contractor shall not be allowed to substitute other sub-contractors in place of those named in the tender without written approval from the Consultant.

Sub-Trade	Contractor Name and Address	Scope of Work	Value of Work

Licensed Surveyor to be Used on the Project:

Firm or Individual Name: \_\_\_\_\_

Address: \_\_\_\_\_

**8. Project personnel:**

The Tenderer shall include below, the names, qualifications and previous experience of those people who will be directly involved with the project. The names shall, for example, include foreman, superintendent, project engineer and/or project manager.

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Years of Experience: \_\_\_\_\_ Years with Company: \_\_\_\_\_

Related Experience: \_\_\_\_\_

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Years of Experience: \_\_\_\_\_ Years with Company: \_\_\_\_\_

Related Experience: \_\_\_\_\_

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Years of Experience: \_\_\_\_\_ Years with Company: \_\_\_\_\_

Related Experience: \_\_\_\_\_

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Years of Experience: \_\_\_\_\_ Years with Company: \_\_\_\_\_

Related Experience: \_\_\_\_\_

**Traffic Control Manager:**

Name: \_\_\_\_\_

Years of Experience: \_\_\_\_\_ Years with Company: \_\_\_\_\_

**9. Tenderer's Safety Data:**

The Owner is committed to working with safe contractors. Before the Tenderer or the Tenderer's subcontractor is allowed to work, safety performance will be reviewed by the Owner. The Owner requires that all Tenderers and subcontractors be registered and in good standing with the Workers' Compensation Board of Prince Edward Island.

Recordable Incidents

Indicate Tenderer's Workers' Compensation registration number

Using the Tenderer's last year's Accident Statements, complete the following:

- a. Number of injury related fatalities: \_\_\_\_\_
- b. Number of injuries with lost workdays: \_\_\_\_\_
- c. Number of injuries requiring medical attention, but no lost work days: \_\_\_\_\_
- d. Total number of injuries: \_\_\_\_\_

Note: No "First Aid" cases should be included in the above.

Number of "First Aid" cases in addition to above: \_\_\_\_\_

Number of employee hours worked last year:	Field	_____
	Supervisory	_____
	Total	_____

Safety Program

Do you hold safety meetings for:

	<u>Yes</u>	<u>No</u>	<u>Frequency</u>	<u>Title of Person Conducting Meeting</u>
Employees	_____	_____	_____	_____
Subcontractors	_____	_____	_____	_____

Do you conduct job safety inspections? Yes \_\_\_ No \_\_\_

a. Do you have a formal safety program? Yes \_\_\_ No \_\_\_

b. Who will be your designated safety contact person on site?

\_\_\_\_\_

List the names of those employees who will be on the Owner's site that are certified in first aid. (Attach a separate list, if necessary.)

Employee Name

Expiry Date of Certificate

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

This is to certify that the data and information provided is accurate. It also gives permission to the Owner to verify the above information with the Workers' Compensation Board of Prince Edward Island.

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title\*: \_\_\_\_\_

Date: \_\_\_\_\_

\* President or senior company officer.

**END OF SECTION**



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## Charlottetown Supplier Code of Conduct

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### **Introduction**

The City of Charlottetown (“Charlottetown”) is committed to conducting business in an ethical, legal, and socially responsible manner. Charlottetown expects its Suppliers to adhere to equivalent standards.

The Charlottetown Supplier Code of Conduct (SCoC) sets out the minimum ethical standards and business conduct for service providers including subcontractors, consultants, manufacturers, fabricators, distributors, or any entity that provides Charlottetown with goods or services (collectively “Suppliers”).

Charlottetown expects all its suppliers to affirm their compliance with the standards in this SCoC and ensure the standards are being upheld by any of their subcontractors. Stated compliance with all provisions set out in this SCoC will proclaim that the supplier is compliant with the core labour conventions of the International Labour Organization (ILO) and other applicable regulations in the countries in which they operate.

***Charlottetown reserves the right to audit suppliers and request additional documentation to ensure compliance with all applicable laws and standards as well as this SCoC.***

***Charlottetown reserves the right to discontinue business with suppliers who are not responsive to requests to address concerns around workplace practices and instances of non-compliance with these minimum ethical standards and business conduct for suppliers.***



## **SUPPLIER CODE OF CONDUCT**

### **Employee Treatment, Harassment and Abuse**

The supplier's employees shall be treated with respect and dignity and the supplier's disciplinary policies and procedures shall be clearly defined and communicated to employees before application. There shall be no harsh and inhumane treatment, including any physical, sexual, psychological, verbal harassment or abuse, or corporal punishment; nor is there to be the threat of any such treatment.

### **Non-Discrimination**

The supplier shall ensure no person is subject to any discrimination in employment, including hiring, compensation, advancement, discipline, termination, or retirement, on the basis of race, colour, age, gender, sexual orientation, ethnicity, nationality, disability, place of origin, ancestry, religion, political affiliation, union membership, family status or marital status.

### **Forced Labour**

There shall be no use of forced labour, including prison labour, indentured labour, bonded labour, or other forms of forced labour. All work shall be voluntary, and workers shall be free to leave upon reasonable notice.

### **Child Labour**

No persons shall be employed under the age of 15 or younger than the age for completing compulsory education in the country of manufacture, whichever is higher. Workers under the age of 18 shall not perform work that is likely to jeopardize the health or safety of young workers.

### **Health and Safety**

The supplier shall provide a safe and healthy working environment to prevent accidents and injury to health arising out of, or linked with, or occurring in the course of work or as a result of the operation of the supplier's facilities.

### **Freedom of Association and Collective Bargaining**

The supplier shall recognize and respect the right of employees to freedom of association and collective bargaining. Workers and employers shall have the right to establish and join labour organizations of their own choosing and elect their representatives, for the purpose of furthering and defending the interests of workers or of employers.

### **Wages and Benefits**

The supplier shall pay all employees at least the minimum wage or the appropriate prevailing wage in its country of origin, whichever is higher, comply with all legal requirements on wages, and provide any benefits required by law or contract. Deductions from wages as a disciplinary manner shall not be permitted and payment shall occur in a timely manner with pay stub or similar documentation.

### **Hours of Work**

The supplier shall not require workers to work more than the regular and overtime hours allowed by the law of the country where the workers are employed. The regular work week shall not exceed 48 hours. Employers shall allow workers at least 24 consecutive hours of rest in every seven-day period.

### **Overtime Compensation**

Every worker has a right to compensation for a regular work week that is sufficient to meet the worker's basic needs and provide some discretionary income. The supplier shall be compensated for overtime hours at such premium rate as is legally required in the country of manufacture or, in those countries where such laws do not exist, at a rate at least equal to their regular hourly compensation rate.

### **Anti-Corruption Business Practices and Bribery**

The supplier will not, directly, or indirectly, pay, give, offer, or promise anything of value to any local or foreign government official (or to any person for the benefit of a government official) for the purpose of corruptly causing the government official to improperly act or use his or her influence in obtaining or retaining any business or securing any improper advantage for Charlottetown or the Supplier.

### **Environmental Responsibility**

The supplier shall take responsibility to reduce the environmental impact of their products and services as well as their overall operations or 'in-house' practices. Suppliers must not be in violation of any national or provincial environmental regulations. Suppliers should be adopting responsible measures to mitigate negative environment impacts.

### **Subcontractors and Sources**

Charlottetown requires all suppliers that support the City as subcontractors, manufacturers, or sources of goods to comply with all of the same policies stated in Charlottetown's SCoC. All subcontractors and suppliers are required to comply with all applicable and national laws. Direct suppliers must monitor the subcontractors, manufacturers, or sources of goods for meeting or exceeding the SCoC and supply chains are expected to be transparent and traceable.

### **Signatories**

The person signing this Form (i) certifies that they are a duly authorized representative of the Proponent with the authority to sign this acknowledgment and commit the Proponent to the provisions contained herein and (ii) on behalf of the Proponent and without personal liability, acknowledges and agrees that the Proponent has read and understood, and agrees to abide by, all of the standards set out in the Supplier Code of Conduct above.

☐ Yes, we agree to comply with all of the above expectations.

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Name and Title of Authorized Representative

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Date (MM-DD-YYYY)

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Signature

## General

Agreement: CCDC18-2001, Civil Works Contract, as amended below form the basis of this Agreement between the Owner and Contractor, including definitions of specific words and terms.

This Agreement made on the \_\_\_\_ day of \_\_\_\_\_ in the year \_\_\_\_.

### BY AND BETWEEN

City of Charlottetown

hereinafter called the "Owner"

and

hereinafter called the "Contractor"

The **Owner and the Contractor** agree as follows:

### ARTICLE A1 - THE WORK

The Contractor shall:

- .1 Perform the Work required by the Contract Documents for

Seaview Boulevard Street Reconstruction, File No. 2024-001

located at Charlottetown, PEI

for which the Agreement has been signed by the parties, and for which

EXP Services Inc.

(Insert above the name of the Consultant)

is acting as and is hereinafter called the "Consultant"

and

- .2 do and fulfill everything indicated by this Agreement, and

- .3 commence the Work by the \_\_\_\_ day of \_\_\_\_\_ in the year 2024 and attain Substantial Performance as certified by the Consultant by the \_\_\_\_ day of \_\_\_\_\_ in the year 2024.

## ARTICLE A2 – AGREEMENTS AND AMENDMENTS

The Contract supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the work, including the bidding documents that are not expressly listed in Article 3 of the Agreement.

## ARTICLE A3 - CONTRACT DOCUMENTS

The following are the Contract Documents referred to in Article A1 of the Agreement – THE WORK:

- .1 Tender Form
- .2 Supplementary Tender Information
- .3 Agreement Between Owner and Contractor
- .4 Definitions
- .5 The General Conditions of the Contract
- .6 Supplementary General Conditions
- .7 Schedule of Prices
- .8 Specifications (as included in Specification Section 00 01 10, Table of Contents)
- .9 Drawings (as listed in Specification Section 00 21 10, Description of Work and List of Drawings)
- .10 Addenda \_\_\_\_ through \_\_\_\_

## ARTICLE A4 - CONTRACT PRICE

- .1 *Unit Prices* form the basis for payment of the *Contract Price*. Quantities in the *Schedule of Quantities and Unit Prices* are estimated. The *estimated Contract Price*, which is the total extended amount indicated in the *Schedule of Quantities and Unit Prices*, is:

\_\_\_\_\_  
\_\_\_\_\_/100 dollars      \$ \_\_\_\_\_

- .2 All amounts are in Canadian funds. Unit Prices **exclude** HST and Contract Price **includes** HST.
- .3 These amounts shall be subject to adjustments as provided in the *Contract Documents*.
- .4 The *Contract Price* will be the sum of the products of the actual final quantities that are incorporated in, or made necessary by the *Work*, as confirmed by count and measurement, multiplied by the appropriate *Unit Prices* from the Tender Form together with any adjustments that are made in accordance with the provisions of the *Contract Documents* plus the amount of HST.

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**ARTICLE A5 - PAYMENT**

- .1 Subject to the provisions of the Contract Documents, the Owner shall make monthly payments on account to the Contractor for the work performed, as certified by the Consultant, subject to a fifteen percent (15%) holdback, the Owner shall in Canadian funds:
  - .1 make progress payments to the Contractor on account of the Contract Price when due in the amount certified by the Consultant together with such Value Added Taxes as may be applicable to such payment, and
  - .2 The Owner shall release to the Contractor the holdback within two weeks of the date on which all of the following requirements have been met:
    - .1 60 days have elapsed from the Date of Substantial Performance of the Works as certified by the Consultant.
    - .2 7 days have elapsed from the date on which the Consultant issued the Certificate of Substantial Performance of the Works.
    - .3 The Contractor has signed the Final Measure.
    - .4 The Contractor has provided the Consultant with the following documents:
      - .1 a statutory declaration to the effect that all expenses incurred in carrying out the Contract have been paid and releasing the Authority from any and all further claims relating to the Contract.
      - .2 a certificate from a Barrister stating that there are no Mechanics' Liens filed relating to the contract works.
      - .3 a clearance certificate from the Worker's Compensation Board, 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.
- .2 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payments shall be made to the Contractor in accordance with the provisions of GC11.1 – INSURANCE.
- .3 Interest:
  - .1 Should either party fail to make payments as they become due under the terms of the Contract or in an award by arbitration or court, interest at two percent (2%) per annum above the prime rate on such unpaid amounts shall also become due and payable until payment. Such interest shall be compounded on a monthly basis. The bank rate shall be the rate established by the Bank of Canada as the minimum rate at which the Bank of Canada makes short term advances to the chartered banks.

- .2 Interest shall apply at the rate and in the manner prescribed by paragraph 5.3.1 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 it is paid.

#### **ARTICLE A6 - RECEIPT OF AND ADDRESSES FOR NOTICES**

- .1 Notices in writing between the parties or between them and the Consultant shall be considered to have been received by the addressee on the date of delivery if delivered to the individual, or to a member of the firm, or to an officer of the corporation for whom they are intended by hand or by registered post; or if sent by regular post, to have been delivered within 5 Working Days of the date of mailing when addressed as follows:

- .1 The Owner at 199 Queen Street, P.O. Box 98, Charlottetown,  
PE C1A 7K2  
(Address of Owner)

- .2 The Contractor at \_\_\_\_\_  
\_\_\_\_\_  
(Address of Contractor)

- .3 The Consultant at 555 Mapleton Road, Suite 100, Moncton, NB  
E1G 2K5  
(Address of Consultant)

- .4 Vendors are advised that the City has now moved to electronic payments on goods and services provided to the City. Payment of invoices will be made by way of Electronic Funds Transfer. The successful proponent will be required to provide the necessary banking information for registration on the City's system.

#### **ARTICLE A7 - QUANTITIES AND MEASUREMENT**

- .1 The quantities shown in Section 00 41 43 – Tender Form (Unit Prices) are estimated.
- .2 Measurement for the actual quantities used to determine payments and Contract Price shall be in accordance with Section 01 29 00 – Payment Procedures.

## **ARTICLE A8 - SUCCESSION**

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

## **ARTICLE A9 - RIGHTS AND REMEDIES**

No action or failure to act by the Owner, Consultant or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

## **ARTICLE A10 - TIME**

Time shall be construed as being of the essence of the Contract. The Works will be completed by the date indicated in Article A1 herein and shall be referred to as the Date of Completion.

## **ARTICLE A11- LIQUIDATED DAMAGES**

Should the Contractor fail to complete the works by the Date of Completion, the period of time from the Date of Completion to the time until all required Work is performed completely as determined by the Consultant, shall be termed the Period of Delay.

In the event of there being a Period of Delay, the Contractor will be liable for and will pay to the Owner the cost of continuance of supervision during the Period of Delay, and all additional fees, disbursements and costs incurred by the Owner by reason of there being such Period of Delay for each and every calendar day that the work or works shall remain unfinished after the time so specified. The said sum or sums in view of the difficulty of ascertaining the losses which the Owner may suffer by reason of delay in the performance of the said Works, is hereby agreed upon, fixed and determined by the parties hereto as liquidated damages that the Owner will suffer by reason of said delay and default and not as penalty. The Contractor agrees to pay the Owner liquidated damages for each payment following the event until the project reaches Substantial Performance as certified by the Consultant.

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

SIGNED AND DELIVERED

In the presence of:

OWNER

\_\_\_\_\_  
*Name of Owner*

WITNESS

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name and Title of Person Signing*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name and Title of Person Signing*

\_\_\_\_\_  
*Name and Title of Person Signing*

CONTRACTOR

\_\_\_\_\_  
*Name of Contractor*

WITNESS

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name and Title of Person Signing*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name and Title of Person Signing*

\_\_\_\_\_  
*Name and Title of Person Signing*

*N.B. Where legal jurisdiction, local practice or Owner or Contractor requirements 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.*

**END OF SECTION**



**DEFINITIONS**

## DEFINITIONS

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

**1. 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 an adjustment in *Contract Price* and *Contract Time*.

**2. 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.

**3. 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*.

**4. Consultant**

The *Consultant* is the person or entity identified as such in the Agreement. The *Consultant* is the Engineer or other entity licensed to practise in the province or territory of the *Place of the Work*. The term *Consultant* means the *Consultant* or the *Consultant's* authorized representative.

**5. 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.

**6. 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.

**7. Contract Price**

When *Unit Prices* form the basis of payment, the *Contract Price* is the sum of the product of each *Unit Price* stated in the *Schedule of Prices* multiplied by the appropriate actual quantity of each item that is incorporated in or made necessary by the *Work*, plus lump sums, if any, and allowances, if any, stated in the *Schedule of Prices*. When a lump sum stipulated price forms the basis of payment, the *Contract Price* is the amount stipulated in Article A-4 of the Agreement - CONTRACT PRICE.

**8. Contract Time**

The *Contract Time* is the time stipulated in paragraph 1.3 of Article A-1 of the Agreement - THE WORK from commencement of the *Work* to *Substantial Performance of the Work*.

**9. Contractor**

The *Contractor* is the person or entity identified as such in the Agreement. The term *Contractor* means the *Contractor* or the *Contractor's* authorized representative as designated to the *Owner* in writing.

**10. 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, schedules, and diagrams.

**11. Owner**

The *Owner* is the person or entity identified as such in the Agreement. The term *Owner* means the *Owner* or the *Owner's* authorized agent or representative as designated to the *Contractor* in writing, but does not include the *Consultant*.

**12. Place of the Work**

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

13. **Product**  
*Product or Products* means material, machinery, equipment, and fixtures forming the *Work*, but does not include *Construction Equipment*.
14. **Project**  
The *Project* means the total construction contemplated of which the *Work* may be the whole or a part.
15. **Provide**  
*Provide* means to supply and install.
16. **Schedule of Prices**  
The *Schedule of Prices* is the schedule listed in Article A-3 - CONTRACT DOCUMENTS identifying items of work, estimated quantities, units of measure, and *Unit Prices*.
17. **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*.
18. **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, and the services necessary for the performance of the *Work*.
19. **Subcontractor**  
A *Subcontractor* is a person or entity having a direct contract with the *Contractor* to perform a part or parts of the *Work*, or to supply *Products* worked to a special design for the *Work*.
20. **Substantial Performance of the Work**  
*Substantial Performance of the Work* is as defined in the lien legislation applicable to the *Place of the Work*. If such legislation is not in force or does not contain such definition, or if the *Work* is governed by the Civil Code of Quebec, *Substantial Performance of the Work* shall have been reached when the *Work* is ready for use or is being used for the purpose intended and is so certified by the *Consultant*.
21. **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*.
22. **Supplier**  
A *Supplier* is a person or entity having a direct contract with the *Contractor* to supply *Products* not worked to a special design for the *Work*.
23. **Temporary Work**  
*Temporary Work* means temporary supports, structures, facilities, services, and other temporary things, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.
24. **Unit Price**  
A *Unit Price* is the amount payable for a single unit of work as stated in the *Schedule of Prices*.
25. **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 is by the *Contractor* as imposed by the tax legislation.
26. **Work**  
The *Work* means the total construction and related services required by the *Contract Documents*.
27. **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**

## GENERAL CONDITIONS OF THE CIVIL WORKS CONTRACT

### 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 Except for the provisions of article 12.3.6, 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 of the *Work*.
  - .2 the *Consultant* and the *Contractor*, a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any of the *Work*.
- 1.1.3 The *Contract Documents* are complementary, and what is required by any one shall be as binding as if required by all.
- 1.1.4 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- 1.1.5 References in the *Contract Documents* to the singular shall be considered to include the plural as the context requires.
- 1.1.6 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Contractor* in dividing the work among *Subcontractors* and *Suppliers*.
- 1.1.7 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 the *Owner* and the *Contractor*,
    - the Definitions,
    - Supplementary Conditions,
    - the General Conditions,
    - the *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 later dated documents shall govern over earlier documents of the same type.
- 1.1.8 The *Owner* shall provide the *Contractor*, without charge, sufficient copies of the *Contract Documents* to perform the *Work*.
- 1.1.9 *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*.
- 1.1.10 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*, *Consultant*, or *Contractor* shall constitute a waiver of any right or duty afforded any of them under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

### **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 *Contractor*, and the *Consultant*.
- 2.1.3 If the *Consultant's* employment is terminated, the *Owner* shall immediately appoint or reappoint a *Consultant* against whom the *Contractor* makes no reasonable objection and whose status under the *Contract Documents* shall be that of the former *Consultant*.

### **GC 2.2 ROLE OF THE CONSULTANT**

- 2.2.1 The *Consultant* will provide administration of the *Contract* as described in the *Contract Documents* during construction until issuance of the final certificate for payment, and subject to GC 2.1 - AUTHORITY OF THE CONSULTANT and with the *Owner's* concurrence, from time to time until the completion of any correction of defects as provided in paragraph 12.3.3 of GC 12.3 - WARRANTY.
- 2.2.2 The *Consultant* may 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*.
- 2.2.3 The *Consultant* will review the *Work* at intervals appropriate to the progress of construction to:
  - .1 become familiar with the progress and quality of the *Work*,
  - .2 determine if the *Work* is proceeding in general conformity with the *Contract Documents*, and
  - .3 verify quantities of *Work* performed under a *Schedule of Prices*.
- 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 - PROGRESS PAYMENT, and GC 5.7 - 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 carry out the *Work* in accordance with the *Contract Documents*. The *Consultant* will not have control over, charge of, or be responsible for the acts or omissions of the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or any other persons performing portions of the *Work*.

- 2.2.6 The *Consultant* will be, in the first instance, the interpreter of the requirements of the *Contract Documents* and shall make findings as to the performance thereunder by both parties to the *Contract*, except with respect to GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER. Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents*. When making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Contractor*.
- 2.2.7 Matters in question relating to the performance of the Work or the interpretation of the *Contract Documents*, except for GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER, shall be referred initially to the *Consultant* by notice in writing given to the *Consultant* and to the other party for the *Consultant's* interpretation and finding which will be given by notice in writing to the parties within a reasonable time. With respect to claims, the *Consultant* will make findings as set out in GC 6.6 - CLAIMS, paragraph 6.6.5.
- 2.2.8 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.
- 2.2.9 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*.
- 2.2.10 The *Consultant* will review and take appropriate action upon such *Contractor's* submittals as *Shop Drawings*, *Product* data, and samples, as provided in the *Contract Documents*.
- 2.2.11 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 2.2.12 The *Consultant* will conduct reviews of the Work to determine the date of *Substantial Performance of the Work* as provided in GC 5.4 - SUBSTANTIAL PERFORMANCE OF THE WORK.
- 2.2.13 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.
- 2.2.14 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.

### **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*, or by the *Consultant's* instructions, or the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* reasonable notice of when the work will be ready for review and inspection. The *Contractor* shall arrange for and shall give the *Consultant* reasonable notice 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 designated by the laws or ordinances of 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 the *Consultant* or the *Owner* if such test or inspection is designated in the *Contract Documents*.

#### **GC 2.4 DEFECTIVE WORK**

- 2.4.1 The *Contractor* shall promptly remove from the *Place of the Work* and replace or re-execute defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work has been incorporated in the *Work* and whether or not 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 removals or replacements 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 determination.

### **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 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 *Owner's* own forces with the *Work* of the *Contract*;
  - .2 assume overall responsibility for compliance with the applicable health and construction safety legislation at the *Place of the Work*;
  - .3 enter into separate contracts with other contractors under conditions of contract which are compatible with the conditions of the *Contract*;
  - .4 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
  - .5 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 introduce and store products and use the *Owner's* or other contractor's construction equipment to execute their work;
  - .2 cooperate with other contractors and the *Owner* in reviewing their construction schedules; and
  - .3 where part of the *Work* is affected by or depends upon for its proper execution the work of other contractors or *Owner's* own forces, promptly report to the *Consultant* in writing and prior to proceeding with that part of the *Work*, any apparent deficiencies in such work
- 3.2.4 Where the *Contract Documents* identify the work to be performed by other contractors or the *Owner's* own forces, the *Contractor* shall coordinate and schedule the *Work* with the work of other contractors and the *Owner's* own forces and interface as specified in the *Contract Documents*.
- 3.2.5 Where a change in the *Work* is required as a result of the co-ordination and interface 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 - CHANGES, GC 6.2 - CHANGE ORDER, and GC 6.3 - CHANGE DIRECTIVE.
- 3.2.6 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.

### **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*.
- 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, paragraph 3.3.1, and paragraph 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 DOCUMENT REVIEW**

- 3.4.1 The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency, or omission the *Contractor* may discover. Such review by the *Contractor* shall be to the best of the *Contractor's* knowledge, information, and belief and in making such review the *Contractor* does not assume any responsibility to the *Owner* or the *Consultant* for the accuracy of the review. The *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Contractor* did not discover. If the *Contractor* does discover any error, inconsistency, or omission in the *Contract Documents*, the *Contractor* shall not proceed with the work affected until the *Contractor* has received corrected or missing information from the *Consultant*.

### **GC 3.5 CONSTRUCTION SCHEDULE**

- 3.5.1 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 3.6 SUPERVISION**

- 3.6.1 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.
- 3.6.2 The appointed representative shall represent the *Contractor* at the *Place of the Work* and notices and instructions given to the appointed representative by the *Consultant* shall be held to have been received by the *Contractor*.

### **GC 3.7 LAYOUT OF THE WORK**

- 3.7.1 The *Owner* shall, in consultation with the *Contractor*, establish reference points for construction which are necessary for the *Contractor* to proceed with the *Work*.
- 3.7.2 The *Contractor* shall be responsible for laying out the *Work*, shall preserve and protect the established reference points, and shall not change or relocate the established reference points without the approval of the *Consultant*.
- 3.7.3 The *Contractor* shall advise the *Consultant* whenever any established reference point is lost, destroyed, damaged, or requires relocation as a result of the *Contractor's* operations. The cost to reestablish any reference point that is lost, destroyed, damaged, or requires relocation as a result of the *Contractor's* operations, shall be at the *Contractor's* expense.

### **GC 3.8 SUBCONTRACTORS AND SUPPLIERS**

- 3.8.1 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 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 of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Contractor*.
- 3.8.2 The *Contractor* shall indicate in writing, at the request of 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.
- 3.8.3 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.
- 3.8.4 If the *Owner* requires the *Contractor* to change a proposed *Subcontractor* or *Supplier*, the *Contract Price* and *Contract Time* shall be adjusted by the differences occasioned by such required change.
- 3.8.5 The *Contractor* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Contractor* may reasonably object.
- 3.8.6 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 3.9 LABOUR AND PRODUCTS

- 3.9.1 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*.
- 3.9.2 *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*.
- 3.9.3 The *Contractor* shall maintain good order and discipline among the *Contractor's* employees engaged on the *Work* and shall not employ on the *Work* anyone not skilled in the tasks assigned.

### GC 3.10 DOCUMENTS AT THE SITE

- 3.10.1 The *Contractor* shall keep one copy of current *Contract Documents*, submittals, reports, and records of meetings at the *Place of the Work*, in good order and available to the *Owner* and the *Consultant*.

### GC 3.11 SHOP DRAWINGS

- 3.11.1 The *Contractor* shall provide *Shop Drawings* as required in the *Contract Documents*.
- 3.11.2 The *Contractor* shall review all *Shop Drawings* prior to submission to the *Consultant*. The *Contractor* represents by this review that:
  - .1 the *Contractor* has determined and verified all field measurements, field construction conditions, materials, *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 *Contract Documents*.
- 3.11.3 The *Contractor* shall confirm the review of each shop drawing by stamp, date, and signature of the person responsible for the review. At the time of submission the *Contractor* shall notify the *Consultant* in writing of any deviations in the *Shop Drawings* from the requirements of the *Contract Documents*.
- 3.11.4 The *Contractor* shall submit *Shop Drawings* to the *Consultant* to review in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of other contractors. Upon request of the *Contractor* or the *Consultant*, they jointly shall prepare a schedule of the dates for submission and return of *Shop Drawings*. *Shop Drawings* which require approval of any legally constituted authority having jurisdiction shall be submitted to such authority by the *Contractor* for approval.
- 3.11.5 The *Contractor* shall submit *Shop Drawings* in the form specified or as the *Consultant* may direct. The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or otherwise with reasonable promptness so as to cause no delay. The *Consultant's* review is for conformity to the design concept and for general arrangement only. 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* unless the *Consultant* expressly notes the acceptance of a deviation on the *Shop Drawings*.
- 3.11.6 Upon the *Consultant's* request, the *Contractor* shall revise and resubmit *Shop Drawings* which the *Consultant* rejects as inconsistent with the *Contract Documents* unless otherwise directed by the *Consultant*. The *Contractor* shall notify the *Consultant* in writing of any revisions to the resubmission other than those requested by the *Consultant*.

### GC 3.12 USE OF THE WORK

- 3.12.1 The *Contractor* shall confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and operations of employees to limits indicated by laws, ordinances, permits, or the *Contract Documents* and shall not unreasonably encumber the *Place of Work* with *Products*.
- 3.12.2 The *Contractor* shall not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety of the *Work*.

### **GC 3.13 CUTTING AND REMEDIAL WORK**

- 3.13.1 The *Contractor* shall do the cutting and remedial work required to make the several parts of the *Work* come together properly.
- 3.13.2 The *Contractor* shall co-ordinate the *Work* to ensure that this requirement is kept to a minimum.
- 3.13.3 Should the *Owner*, the *Consultant*, other contractors or anyone employed by them 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 - CHANGES, GC 6.2 - CHANGE ORDER, and GC 6.3 - CHANGE DIRECTIVE.
- 3.13.4 Cutting and remedial work shall be performed by specialists familiar with the *Products* affected and shall be performed in a manner to neither damage nor endanger the *Work*.

### **GC 3.14 CLEANUP**

- 3.14.1 The *Contractor* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the *Owner*, other contractors or their employees.
- 3.14.2 Before applying for *Substantial Performance of the Work* as provided in GC 5.7 - SUBSTANTIAL PERFORMANCE OF THE WORK, the *Contractor* shall remove waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees, and shall leave the *Work* clean and suitable for use or occupancy by the *Owner*. The *Contractor* shall remove products, tools, *Construction Equipment* and *Temporary Work* not required for the performance of the remaining work.
- 3.14.3 Prior to application for the final certificate for payment, the *Contractor* shall remove any remaining products, tools, *Construction Equipment*, *Temporary Work*, and waste products and debris, other than those resulting from the work of the *Owner*, other contractors or their employees.

## **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 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 costs under any cash allowance exceed the amount of the allowance, the *Contractor* shall be compensated for the excess incurred and substantiated plus an amount for overhead and profit on the excess as set out in the *Contract Documents*. Where costs under any cash allowance are less than the amount of the allowance, the *Owner* shall be credited for the unexpended portion of the cash allowance, but not for the *Contractor's* overhead and profit on such amount. Multiple cash allowances shall not be combined for the purpose of calculating the foregoing.
- 4.1.5 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the actual cost and each cash allowance.
- 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 *Consultant* and *Owner* must authorize ordering of items called for under cash allowances 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 Expenditures under the contingency allowance shall be authorized and valued as provided in GC 6.1 - CHANGES, GC 6.2 - CHANGE ORDER, and GC 6.3 - CHANGE DIRECTIVE.

- 4.2.3 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.2.2 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 notify the *Contractor* in writing of any material change in the *Owner's* financial arrangements during performance of the *Contract*.

### **GC 5.2 BASIS OF PAYMENT FOR UNIT PRICE WORK**

- 5.2.1 Payment for *Unit Price* work shall be based on the *Unit Prices* in the *Contract*.
- 5.2.2 The *Contractor* shall measure the *Work* and the *Consultant* will verify such measurements to determine payment to the *Contractor* in accordance with the measurement provisions of the *Contract Documents*.

### **GC 5.3 BASIS OF PAYMENT FOR LUMP SUM WORK**

- 5.3.1 Payment for lump sum work shall be based on the stipulated price(s) in the *Contract*.

### **GC 5.4 BASIS OF PAYMENT FOR COST PLUS WORK**

- 5.4.1 Payment for cost plus work shall be based on the cost of such work, as provided in paragraph 5.4.2, plus a fee calculated as a percentage of the cost of such work, for the *Contractor's* overhead and profit. The percentage amount shall be as provided in the *Contract Documents* but shall not be applied to the cost of *Construction Equipment* when such cost is based on rates which already include the *Contractor's* overhead and profit.
- 5.4.2 The cost of cost plus work shall be at rates prevailing in the locality of the *Place of the Work* and shall include the following cost elements as applicable to such work:
- .1 wages and benefits paid for labour in the direct employ of the *Contractor* under applicable collective bargaining agreements, or under a salary or wage schedule agreed upon by the *Owner* and *Contractor*;
  - .2 salaries, wages, and benefits of the *Contractor's* personnel, when stationed at the field office, in whatever capacity employed; or personnel at shops or on the road, engaged in expediting the production or transportation of materials or equipment;
  - .3 contributions, assessments, or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan, insofar as such cost is based on wages, salaries, or other remuneration paid to employees of the *Contractor* and included in the cost of the *Work* as provided in paragraphs 5.4.2.1 and 5.4.2.2;
  - .4 travel and subsistence expenses of the *Contractor's* personnel described in paragraphs 5.4.2.1 and 5.4.2.2;
  - .5 the cost of all *Products* including cost of transportation thereof;
  - .6 the cost of materials, supplies, *Construction Equipment*, *Temporary Work*, and hand tools not owned by the workers, including transportation, and maintenance thereof, which are consumed in the performance of the *Work*; and cost less salvage value on such items used but not consumed, which remain the property of the *Contractor*;
  - .7 the cost of all tools and *Construction Equipment*, exclusive of hand tools used in the performance of the *Work*, whether rented from or provided by the *Contractor* or others, including installation, minor repairs and replacements, dismantling, removal, transportation and delivery cost thereof;
  - .8 deposits lost;
  - .9 the amounts of all subcontracts;
  - .10 the cost of quality assurance such as independent inspection and testing services;
  - .11 charges levied by authorities having jurisdiction at the *Place of the Work*;

- .12 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;
  - .13 any adjustment in premiums for all bonds and insurance which the *Contractor* is required, by the *Contract Documents*, to purchase and maintain;
  - .14 any adjustment in taxes and duties for which the *Contractor* is liable;
  - .15 charges for long distance telephone and facsimile communications, courier services, expressage, and petty items incurred in relation to the performance of the *Work*;
  - .16 the cost of removal and disposal of waste products and debris; and
  - .17 cost incurred due to emergencies affecting the safety of persons or property.
- 5.4.3 The *Contractor* shall obtain the *Owner's* approval prior to subcontracting or entering into other agreements for cost plus work.
- 5.4.4 The *Consultant* may refuse to certify payment for all or part of the cost of any item under any cost element, where the item in question was unsuitable, unnecessary or the cost was otherwise improperly incurred in the performance of the *Work*.
- 5.4.5 The *Contractor* shall keep full and detailed accounts and records necessary for the documentation of the cost of cost plus work and shall provide the *Consultant* with copies thereof when requested.
- 5.4.6 The *Owner* shall be afforded reasonable access to all of the *Contractor's* books, records, correspondence, instructions, drawings, receipts, vouchers, and memoranda related to the cost of cost plus work, and for this purpose the *Contractor* shall preserve such records for a period of one year from the date of *Substantial Performance of the Work*.

#### **GC 5.5 APPLICATIONS FOR PROGRESS PAYMENT**

- 5.5.1 Applications for payment on account as provided in Article A-5 of the Agreement - PAYMENT may be made monthly as the *Work* progresses.
- 5.5.2 Applications for payment shall be dated the last day of the agreed monthly payment period and 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* at that date.
- 5.5.3 Where the basis of payment of the *Contract Price* is *Unit Prices*, applications for payment shall include quantity measurements and any other data requested by the *Consultant* to assist the *Consultant* in evaluating the application and verifying quantity measurements.
- 5.5.4 Where the basis of payment of the *Contract Price* is a lump sum stipulated price:
- .1 the *Contractor* shall submit to the *Consultant*, at least 10 *Working 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;
  - .2 the schedule of values shall be made out in such form and supported by such evidence as the *Consultant* may reasonably direct and when accepted by the *Consultant*, shall be used as the basis for applications for payment, unless it is found to be in error; and
  - .3 the *Contractor* shall include a statement based on the schedule of values with each application for payment.
- 5.5.5 Where the basis of payment for a portion of the *Work* is cost plus, applications for payment shall be based on the cost of the work performed plus the amount of the fee earned, in accordance with GC 5.4 - BASIS OF PAYMENT FOR COST PLUS WORK.
- 5.5.6 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 5.6 PROGRESS PAYMENT**

- 5.6.1 The *Consultant* will issue to the *Owner*, no later than 5 *Working Days* after the receipt of an application for payment from the *Contractor* submitted in accordance with GC 5.2 - APPLICATIONS FOR PROGRESS 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* amends the application, the *Consultant* will promptly notify the *Contractor* in writing giving reasons for the amendment.
- 5.6.2 The *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement - PAYMENT no later than 5 *Working Days* after the date of a certificate for payment issued by the *Consultant*.
- 5.6.3 Where the basis of payment of the *Contract Price* is *Unit Prices*, quantities for progress payments shall be considered approximate until final verification of quantities by the *Consultant*. A certificate for progress payment shall not be construed as the *Consultant's* final verification of quantities. Final verification of quantities will be made after all work of an item is completed.

## **GC 5.7 SUBSTANTIAL PERFORMANCE OF THE WORK**

- 5.7.1 When the *Contractor* considers that the *Work* is substantially performed, or if permitted by the lien legislation applicable to the *Place of the Work* a designated portion thereof which the *Owner* agrees to accept separately is substantially performed, the *Contractor* shall prepare and submit to the *Consultant* a comprehensive list of items to be completed or corrected and apply for a review by the *Consultant* to establish *Substantial Performance of the Work* or substantial performance of the designated portion of the *Work*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.
- 5.7.2 No later than 15 *Working Days* after the receipt of the *Contractor's* list and application, the *Consultant* will review the *Work* to verify the validity of the application and notify the *Contractor* whether the *Work* or the designated portion of the *Work* is substantially performed.
- 5.7.3 The *Consultant* will state the date of *Substantial Performance of the Work* or designated portion of the *Work* in a certificate.
- 5.7.4 Immediately following the issuance of the certificate of *Substantial Performance of the Work*, the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

## **GC 5.8 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK**

- 5.8.1 After the issuance of the certificate of *Substantial Performance of the Work*, the *Contractor* shall:
  - .1 submit an application for payment of the holdback amount,
  - .2 submit a sworn or affirmed statement that all accounts for labour, subcontracts, *Products*, *Construction Equipment*, and other indebtedness which may have been incurred by the *Contractor* in the *Substantial Performance of the Work* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute.
- 5.8.2 After the receipt of an application for payment from the *Contractor* and the sworn or affirmed statement as provided in paragraph 5.8.1, the *Consultant* will issue a certificate for payment of the holdback amount.
- 5.8.3 Where the holdback amount required by the applicable lien legislation has not been placed in a separate holdback account, the *Owner* shall, 5 *Working 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*.
- 5.8.4 In the common law jurisdictions, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable on the day following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*. Where lien legislation does not exist or apply, the holdback amount shall be due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between the parties. The *Owner* may retain out of the holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the lien legislation applicable to the *Place of the Work*, other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.

- 5.8.5 In the Province of Quebec, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable no later than 30 days after the issuance of the certificate. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.

#### **GC 5.9 PROGRESSIVE RELEASE OF HOLDBACK**

- 5.9.1 In the common law jurisdictions, where legislation permits and where, upon application by the *Contractor*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Contractor* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, on the first *Working Day* following the expiration of the holdback period for such work stipulated in the lien legislation applicable to the *Place of the Work*.
- 5.9.2 In the Province of Quebec, where, upon application by the *Contractor*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Contractor* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, no later than 30 days after such certification by the *Consultant*. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.
- 5.9.2 Notwithstanding the provisions of the preceding paragraph, and notwithstanding the wording of such certificates, the *Contractor* shall ensure that such subcontract work or *Products* is 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 such certificates were issued.

#### **GC 5.10 FINAL PAYMENT**

- 5.10.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment.
- 5.10.2 The *Consultant* will, no later than 15 *Working Days* after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and notify the *Contractor* that the application is valid or give reasons why it is not valid.
- 5.10.3 When the *Consultant* finds the *Contractor's* application for final payment valid, the *Consultant* will promptly issue a final certificate for payment.
- 5.10.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 - WORKERS' COMPENSATION, and any lien legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 *Working Days* after the issuance of a final certificate for payment, pay the *Contractor* as provided in Article A-5 of the Agreement - PAYMENT.

#### **GC 5.11 WITHHOLDING OF PAYMENT**

- 5.11.1 If because of climatic or other conditions reasonably beyond the control of the *Contractor*, there are items of work that cannot be performed, 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 remaining work.

#### **GC 5.12 NON-CONFORMING WORK**

- 5.12.1 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**

### **GC 6.1 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* or the *Contract Time* is proposed or required, the *Consultant* will provide notice in writing to the *Contractor* describing the proposed change. The *Contractor* shall present, in a form acceptable to the *Consultant*, a method of adjustment or an amount of adjustment of the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change.
- 6.2.2 The method of adjustment of the *Contract Price* presented by the *Contractor* may be:
- .1 *Unit Prices* listed in the *Schedule of Prices* that are applicable to the change in the *Work* or, if *Unit Prices* listed in the *Schedule of Prices* are not directly applicable, by unit prices deduced or extrapolated from such *Unit Prices*,
  - .2 a lump sum or unit price quotation, or
  - .3 the cost plus method as provided in GC 5.4 - BASIS OF PAYMENT FOR COST PLUS WORK.
- 6.2.3 When the *Owner* and *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*, signed by *Owner* and *Contractor*. The value of the work performed as the result of a *Change Order* shall be included in 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 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 by the *Owner* to direct a change in the *Work* that is within the general scope of the *Contract Documents*.
- 6.3.3 Upon receipt of a *Change Directive*, the *Contractor* shall proceed promptly with the change in the *Work*.
- 6.3.4 The adjustment in the *Contract Price* for a change in the *Work* carried out by way of a *Change Directive* shall be on the basis of the *Contractor's* actual expenditures and savings attributable to the change. If a change in the *Work* results in expenditures only, the change in the *Work* shall be valued as cost plus work in accordance with GC 5.4 - BASIS OF PAYMENT FOR COST PLUS WORK.
- 6.3.5 If a change in the *Work* results in savings only, the amount of the credit shall be the actual cost savings to the *Contractor*, without deduction for overhead or profit.
- 6.3.6 If a change in the *Work* results in both expenditures and savings, the change in the *Work* shall be valued as specified in GC 6.3.4 and GC 6.3.5, except that overhead and profit on the cost plus work shall be payable only on the net increase, if any, with respect to that change in the *Work*.
- 6.3.7 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.
- 6.3.8 If the *Owner* and *Contractor* do not agree on the proposed adjustment in the *Contract Time* or the method of determining it, the adjustment shall be referred to the *Consultant* for determination.

- 6.3.9 If at any time after the start of the work directed by a *Change Directive*, 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* signed by *Owner* and *Contractor*.

#### 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* which 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 notify the other party in writing before conditions 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 *Consultant*, with the *Owner's* approval, will 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 report the reasons for this finding to the *Owner* and the *Contractor* in writing.
- 6.4.4 The *Contractor* shall not be entitled to an adjustment in the *Contract Price* or the *Contract Time* if such conditions were reasonably apparent prior to the time of bid closing.

#### GC 6.5 DELAYS

- 6.5.1 If the *Contractor* is delayed in the performance of the *Work* by an action or omission of the *Owner*, *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, 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 other cause beyond the *Contractor's* control, other than one resulting from a default of 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*.
- 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 delay, providing however, that in the case of a continuing cause of delay only one notice shall be necessary.

- 6.5.5 If no schedule is made under paragraph 2.2.9 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 and not then, unless the request is reasonable.

#### GC6.6 CLAIMS

- 6.6.1 If the *Contractor* intends to make a claim for additional payment, or if the *Owner* intends to make a claim for a credit to the *Contract Price* or for damages of any kind, the party that intends to make the claim shall give notice in writing of intent to claim to the other party and to the *Consultant* as soon as practicable, but no later than 10 *Working Days* after commencement of the event or series of events giving rise to the claim. Failure to provide such notification shall invalidate the claim.
- 6.6.2 Upon commencement of the event or series of events giving rise to the claim, the party intending to make a claim shall:
- .1 take all reasonable measures to mitigate any loss or damage 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 Within 30 *Working Days* after commencement of the event or series of events giving rise to the claim, or such other reasonable time as may be agreed by the *Consultant*, the party making the claim shall submit to the *Consultant* a detailed account of the amount claimed and the grounds upon which the claim is based.
- 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 with 30 *Working Days* 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 the other party within 30 *Working Days* after receipt thereof by the *Consultant*, or such other time period as may be agreed by the parties. If such finding is not acceptable to both parties, the claim shall be settled in accordance with Part 8 of the General Conditions - DISPUTE RESOLUTION.

#### GC 6.7 QUANTITY VARIATIONS

- 6.7.1 The *Owner* or the *Contractor* may request an adjustment to a *Unit Price* contained in a *Schedule of Prices* included in the *Contract* provided that the actual quantity of the item in the *Schedule of Prices* exceeds or falls short of the estimated quantity by more than 15%.
- 6.7.2 Where the actual quantity exceeds the estimated quantity by more than 15%, a *Unit Price* adjusted pursuant to paragraph 6.7.1 shall apply only to the quantity that exceeds 115% of the estimated quantity.
- 6.7.3 Where the actual quantity falls short of the estimated quantity by more than 15%, a *Unit Price* adjusted pursuant to paragraph 6.7.1 shall not exceed the *Unit Price* that would cause the extended amount to equal the original extended amount derived from the original *Unit Price* and estimated quantity.
- 6.7.4 If either party requests adjustment of a *Unit Price*, both parties shall make all reasonable efforts to agree on a revised *Unit Price*. The agreed revised *Unit Price* shall be recorded in a Change Order.
- 6.7.5 If agreement on a revised *Unit Price* is not reached, the matter shall be subject to final determination in accordance with Part 8 - DISPUTE RESOLUTION. Pending determination of the revised *Unit Price*, payment for the *Work* performed shall be included in progress payments based on the unrevised *Unit Price*.

## PART 7 DEFAULT NOTICE

### GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, STOP 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, by giving the *Contractor* or receiver or trustee in bankruptcy notice in writing, terminate the *Contract*.
- 7.1.2 If the *Contractor* neglects to prosecute 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* that sufficient cause exists to justify such action, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, notify the *Contractor* in writing 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.
- 7.1.3 If the default cannot be corrected in the 5 *Working Days* specified, 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, and
  - .2 provides the *Owner* with an acceptable schedule for such correction, and
  - .3 corrects the default in accordance with such schedule.
- 7.1.4 If the *Contractor* fails to correct the default in the time specified or subsequently agreed upon, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may:
- .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Contractor* 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* delivered to the *Place of the Work*, subject to the rights of third parties, and finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense, and
  - .2 withhold further payment to the *Contractor* until a final certificate for payment is issued, and
  - .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.

### GC 7.2 CONTRACTOR'S RIGHT TO STOP 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, by giving the *Owner* or receiver or trustee in bankruptcy notice in writing, terminate the *Contract*.
- 7.2.2 If the *Work* is stopped 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, by giving the *Owner* notice in writing, terminate the *Contract*.

- 7.2.3 The *Contractor* may notify the *Owner* in writing, 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*, or
  - .2 the *Consultant* fails to issue a certificate as provided in GC 5.3 PROGRESS PAYMENT, or
  - .3 the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by arbitration or court, or
  - .4 the *Owner* violates the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER, confirms by written statement to the *Contractor* that sufficient cause exists.
- 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, stop the *Work* or terminate the *Contract*.
- 7.2.5 If the *Contractor* terminates the *Contract* 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 8.2.3 to 8.2.8 of GC 8.2 - NEGOTIATION, MEDIATION, AND ARBITRATION, and in GC 8.3 - 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 NEGOTIATION, MEDIATION, AND ARBITRATION**

- 8.2.1 In accordance with the latest edition of the Rules for Mediation of Construction Disputes as provided in CCDC 40, 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 Day* period, within 10 *Working Days* after either party by notice in writing requests that the Project Mediator be appointed.

- 8.2.2 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 the notice of dispute setting out particulars of this response and any relevant provisions of the *Contract Documents*.
- 8.2.3 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.
- 8.2.4 After a period of 10 *Working Days* following receipt of a responding party's notice in writing of reply under paragraph 8.2.2, 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 latest edition of the Rules for Mediation of Construction Disputes as provided in CCDC 40.
- 8.2.5 If the dispute has not been resolved within 10 *Working Days* after the Project Mediator was requested under paragraph 8.2.4 or within such further period agreed by the parties, the Project Mediator shall terminate the mediated negotiations by giving notice in writing to both parties.
- 8.2.6 By giving a notice in writing to the other party, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.2.5, either party may refer the dispute to be finally resolved by arbitration under the latest edition of the Rules for Arbitration of Construction Disputes as provided in CCDC 40. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.
- 8.2.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.2.6 is not binding on the parties and, if a notice is not given under paragraph 8.2.6 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.
- 8.2.8 If neither party requires by notice in writing given within 10 *Working Days* of the date of notice requesting arbitration in paragraph 8.2.6 that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.2.6 shall be
- .1 held in abeyance until
    - (1) *Substantial Performance of the Work*,
    - (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 8.2.6.

### **GC 8.3 RETENTION OF RIGHTS**

- 8.3.1 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 notices required under Part 8 of the General Conditions - DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3.
- 8.3.2 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 8.2.6 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* and 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 in the *Contract Documents*;
  - .2 acts or omissions by the *Owner*, the *Consultant*, other contractors, their agents and employees.
- 9.1.2 Before commencing any work, the *Contractor* shall determine the location of all known 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 the making good such damage at the *Contractor's* expense.
- 9.1.4 Should damage occur to the *Work* or *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 - CHANGES, GC 6.2 - CHANGE ORDER, and GC 6.3 - CHANGE DIRECTIVE.

### **GC 9.2 DAMAGES AND MUTUAL RESPONSIBILITY**

- 9.2.1 If either party to the *Contract* should suffer damage in any manner because of any wrongful act or neglect of the other party or of anyone for whom the other party is responsible in law, then that party shall be reimbursed by the other party for such damage. The reimbursing party shall be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party.
- 9.2.2 If the *Contractor* has caused damage to the work of another contractor on the *Project*, the *Contractor* shall upon due notice in writing settle with the other contractor by negotiation or arbitration. If the other contractor makes a claim against the *Owner* on account of damage alleged to have been so sustained, the *Owner* shall notify the *Contractor* in writing and may require the *Contractor* to defend the action at the *Contractor's* expense. The *Contractor* shall satisfy a final order or judgment against the *Owner* and pay the costs incurred by the *Owner* arising from such action.
- 9.2.3 If the *Contractor* becomes liable to pay or satisfy a final order, judgment, or award against the *Owner*, then the *Contractor*, upon undertaking to indemnify the *Owner* against any and all liability for costs, shall have the right to appeal in the name of the *Owner* such final order or judgment to any and all courts of competent jurisdiction.

### **GC 9.3 TOXIC AND HAZARDOUS SUBSTANCES**

- 9.3.1 For the purposes of applicable environmental legislation, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.3.2 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.
- 9.3.3 The *Owner* shall take all reasonable steps to ensure that no person suffers injury, sickness, or death 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*.
- 9.3.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with legal requirements, to dispose of, store or otherwise render harmless toxic or hazardous substances which were present at the *Place of the Work* prior to the *Contractor* commencing the *Work*.

- 9.3.5 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 disclosed by the *Owner*, as required under paragraph 9.3.2, or which were disclosed but have not been dealt with as required under paragraph 9.3.4, the *Contractor* shall
  - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person suffers injury, sickness, or death and that no property is damaged or destroyed as a result of exposure to or the presence of the substances, and
  - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.
- 9.3.6 If the *Contractor* is delayed in performing the *Work* or incurs additional costs as a result of taking steps required under paragraph 9.3.5.3, the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the *Contractor* shall be reimbursed for reasonable costs incurred as a result of the delay and as a result of taking those steps.
- 9.3.7 Notwithstanding paragraphs 2.2.6 and 2.2.7 of GC 2.2 - ROLE OF THE CONSULTANT, or paragraph 8.1.1 of GC 8.1 - AUTHORITY OF THE CONSULTANT, the *Consultant* may select and rely upon the advice of an independent expert in a dispute under paragraph 9.3.6 and, in that case, the expert shall be deemed to have been jointly retained by the *Owner* and the *Contractor* and shall be jointly paid by them.
- 9.3.8 The *Owner* shall indemnify and hold harmless the *Contractor*, the *Consultant*, their agents and employees, from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of or resulting from 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*. This obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity set out in GC 12.1 - INDEMNIFICATION or which otherwise exist respecting a person or party described in this paragraph.
- 9.3.9 GC 9.3 - TOXIC AND HAZARDOUS SUBSTANCES shall govern over the provisions of paragraph 1.3.1 of GC 1.3 RIGHTS AND REMEDIES or GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.

#### **GC 9.4 ARTIFACTS AND FOSSILS**

- 9.4.1 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*.
- 9.4.2 The *Contractor* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.4.1, and shall notify the *Consultant* immediately upon discovery of such items.
- 9.4.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.4.1. If conditions are found that would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Consultant*, with the *Owner's* approval, 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 9.5 CONSTRUCTION SAFETY**

- 9.5.1 Subject to paragraph 3.2.2.2 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, the *Contractor* shall be solely responsible for construction safety at the *Place or the Work* and for compliance with the rules, regulations, and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the *Work*.

### **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 such included taxes and duties after the time of 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 Except for the permits and fees, including those required under paragraph 10.2.3, which the *Contract Documents* specify as the responsibility of the *Contractor*, the *Owner* shall obtain and pay for all necessary approvals, permits, permanent easements, and rights of servitude.
- 10.2.3 The *Contractor* shall obtain and pay for permits, licenses, inspections and certificates necessary for performance of the *Work* and customarily obtained after signing of the *Contract*.
- 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 notify the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will make the changes required to the *Contract Documents* as provided in GC 6.1 - CHANGES, GC 6.2 - CHANGE ORDER, and GC 6.3 - CHANGE DIRECTIVE.
- 10.2.6 If the *Contractor* fails to notify the *Consultant* in writing; and 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.

#### **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 model, plan, or design of which was supplied to the *Contractor* as part of the *Contract Documents*.

#### **GC 10.4 WORKERS' COMPENSATION**

- 10.4.1 Prior to commencing the *Work*, *Substantial Performance of the Work*, and the issuance of the final certificate for payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*, including payments due thereunder.
- 10.4.2 At any time during the term of the *Contract*, when requested by the *Owner*, the *Contractor* shall provide such evidence of compliance by the *Contractor* and *Subcontractors*.

## PART 11 INSURANCE AND CONTRACT SECURITY

### GC 11.1 INSURANCE

11.1.1 Without restricting the generality of GC 12.1 - INDEMNIFICATION, the *Contractor* shall provide, maintain, and pay for the insurance coverages specified in GC 11.1 - INSURANCE. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the *Work* until the date of the final certificate for payment. 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.

.1 General Liability Insurance:

General liability insurance shall be in the joint names of the *Contractor*, the *Owner*, and the *Consultant*, with limits of not less than \$2,000,000 per occurrence and with a property damage deductible not exceeding \$2,500. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent replacement, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of *Substantial Performance of the Work*, as set out in the certificate of *Substantial Performance of the Work*, on an ongoing basis for a period of 6 years following *Substantial Performance of the Work*. Where the *Contractor* maintains a single, blanket policy, the addition of the *Owner* and the *Consultant* is limited to liability arising out of the *Work* and all operations necessary or incidental thereto. The policy shall be endorsed to provide the *Owner* with not less than 30 days notice in writing in advance of any cancellation, and of change or amendment restricting coverage.

.2 Automobile Liability Insurance:

Automobile liability insurance in respect of licensed vehicles shall have limits of not less than \$2,000,000 inclusive per occurrence for bodily injury, death, and damage to property, covering all licensed vehicles owned or leased by the *Contractor*, and endorsed to provide the *Owner* with not less than 15 days notice in writing in advance of any cancellation, change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.

.3 Aircraft and Watercraft Liability Insurance:

Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft if used directly or indirectly in the performance of the *Work*, including use of additional premises, shall be subject to limits of not less than \$2,000,000 inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof and limits of not less than \$2,000,000 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*. The policies shall be endorsed to provide the *Owner* with not less than 15 days notice in writing in advance of cancellation, change, or amendment restricting coverage.

.4 Property and Boiler and Machinery Insurance:

(1) "All risks" property insurance shall be in the joint names of the *Contractor*, the *Owner*, the *Consultant*, and all *Subcontractors*, insuring not less than the sum of the amount of the *Contract Price* and the full value, as stated in the Supplementary Conditions, of *Products* that are specified to be provided by the *Owner* for incorporation into the *Work*, with a deductible not exceeding \$2,500. The insurance coverage shall not be less than the insurance required by IBC Form 4042 or its equivalent replacement, provided that IBC Form 4042 shall contain the latest edition of the relevant CCDC endorsement form. The coverage shall be maintained continuously until 5 *Working Days* after the date of the final certificate for payment.

(2) Boiler and machinery insurance shall be in the joint names of the *Contractor*, the *Owner*, and the *Consultant* for not less than the replacement value of the boilers, pressure vessels, and other insurable objects forming part of the *Work*. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously from commencement of use or operation of the property insured and until 5 *Working Days* after the date of the final certificate for payment.

- (3) The policies shall allow for partial or total use or occupancy of the *Work*. If because of such use or occupancy the *Contractor* is unable to provide coverage, the *Contractor* shall notify the *Owner* in writing. Prior to such use or occupancy the *Owner* shall provide, maintain, and pay for all risk property and boiler insurance insuring the full value of the *Work*, as in sub-paragraphs (1) and (2), including coverage for such use or occupancy and shall provide the *Contractor* with proof of such insurance. The *Contractor* shall refund to the *Owner* the unearned premiums applicable to the *Contractor's* policies upon termination of coverage.
- (4) The policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. The *Contractor* shall act on behalf of the *Owner* 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*.
- (5) The *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount at 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 and as provided in GC 5.5 - APPLICATIONS FOR PROGRESS PAYMENT and GC 5.6 - PROGRESS PAYMENT. 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*.
- (6) In the case of loss or damage to the *Work* arising from the work of another contractor, or *Owner's* own forces, the *Owner*, in accordance with the *Owner's* obligations under paragraph 3.2.2.4 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, shall pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as provided in GC 5.5 - APPLICATIONS FOR PROGRESS PAYMENT and GC 5.6 - PROGRESS PAYMENT.

.5 Contractors' Equipment Insurance:

"All risks" contractors' equipment insurance covering *Construction Equipment* used by the *Contractor* for the performance of the *Work*, including boiler insurance on temporary boilers and pressure vessels, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. The policies shall be endorsed to provide the *Owner* with not less than 15 days notice in writing in advance of cancellation, change, or amendment restricting coverage. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance, the *Owner* agrees to waive the equipment insurance requirement.

- 11.1.2 The *Contractor* shall be responsible for deductible amounts under the policies except where such amounts may be excluded from the *Contractor's* responsibility by the terms of GC 9.1 - PROTECTION OF WORK AND PROPERTY and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.
- 11.1.3 Where the full insurable value of the *Work* is substantially less than the *Contract Price*, the *Owner* may reduce the amount of insurance required or waive the course of construction insurance requirement.
- 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 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*.

## GC 11.2 CONTRACT SECURITY

- 11.2.1 The *Contractor* shall, prior to commencement of the *Work* or within the specified time, provide to the *Owner* any contract security specified in the *Contract Documents*.
- 11.2.2 If the *Contract Documents* require surety bonds to be provided, such bonds shall be issued by a duly licensed surety company authorized to transact the business of suretyship in the province or territory of the *Place of the Work* and shall be maintained in good standing until the fulfillment of the *Contract*. The form of such bonds shall be in accordance with the latest edition of the CCDC approved bond forms.

## PART 12 INDEMNIFICATION — WAIVER — WARRANTY

### GC 12.1 INDEMNIFICATION

- 12.1.1 The *Contractor* shall indemnify and hold harmless the *Owner* and the *Consultant*, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings (hereinafter called "claims"), by third parties that arise out of, or are attributable to, the *Contractor's* performance of the *Contract* provided such claims are:
- .1 attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and
  - .2 caused by negligent acts or omissions of the *Contractor* or anyone for whose acts the *Contractor* may be liable, and
  - .3 made in writing within a period of 6 years from the date of *Substantial Performance of the Work* as set out in the certificate of *Substantial Performance of the Work*, 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 *Owner* expressly waives the right to indemnity for claims other than those stated above.
- 12.1.2 The obligation of the *Contractor* to indemnify hereunder shall be limited to \$2,000,000 per occurrence from the commencement of the *Work* until *Substantial Performance of the Work* and thereafter to an aggregate limit of \$2,000,000.
- 12.1.3 The *Owner* shall indemnify and hold harmless the *Contractor*, the *Contractor's* agents and employees 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 a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.
- 12.1.4 GC 12.1 - INDEMNIFICATION shall govern over the provisions of paragraph 1.3.1 of GC 1.3 -RIGHTS AND REMEDIES or GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.

### GC 12.2 WAIVER OF CLAIMS

- 12.2.1 Waiver of Claims by *Owner*
- As of the date of the final certificate for payment, the *Owner* expressly waives and releases the *Contractor* from all claims against the *Contractor* including without limitation those that might arise from the negligence or breach of contract by the *Contractor* except one or more of the following:
- .1 those made in writing prior to the date of the final certificate for payment and still unsettled;
  - .2 those arising from the provisions of GC 12.1 - INDEMNIFICATION or GC 12.3 - WARRANTY;
  - .3 those arising from the provisions of paragraph 9.3.5 of GC 9.3 - TOXIC AND HAZARDOUS SUBSTANCES AND MATERIALS and arising from the *Contractor* bringing or introducing any toxic or hazardous substances and materials to the *Place of the Work* after the *Contractor* commences the *Work*.
- In the Common Law provinces GC 12.2.1.4 shall read as follows:
- .4 those made in writing within a period of 6 years from the date of *Substantial Performance of the Work*, as set out in the certificate of *Substantial Performance of the Work*, or within such shorter period as may be prescribed by any limitation statute of the province or territory of the *Place of the Work* and arising from any liability of the *Contractor* for damages resulting from the *Contractor's* performance of the *Contract* with respect to substantial defects or deficiencies in the *Work* for which the *Contractor* is proven responsible. As used herein "substantial defects or deficiencies" means 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*.
- In the Province of Quebec GC 12.2.1.4 shall read as follows:
- .4 those arising under the provisions of Article 2118 of the Civil Code of Quebec.
- 12.2.2 Waiver of Claims by *Contractor*
- As of the date of the final certificate for payment, the *Contractor* expressly waives and releases the *Owner* from all claims against the *Owner* including without limitation those that might arise from the negligence or breach of contract by the *Owner* except:
- .1 those made in writing prior to the *Contractor's* application for final payment and still unsettled; and

.2 those arising from the provisions of GC 9.3 - TOXIC AND HAZARDOUS SUBSTANCES or GC 10.3 - PATENT FEES.

12.2.3 GC 12.2 - WAIVER OF CLAIMS shall govern over the provisions of paragraph 1.3.1 of GC 1.3 - RIGHTS AND REMEDIES, GC 6.6 - CLAIMS, and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.

### **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 of *Substantial Performance of the Work*.
- 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 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 warranty periods specified in the *Contract Documents*.
- 12.3.4 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.
- 12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.3.
- 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 responsibility of the warrantor.

**INSURANCE REQUIREMENTS**

## CCDC 41 CCDC INSURANCE REQUIREMENTS

**PUBLICATION DATE: JANUARY 21, 2008**

1. General liability insurance shall be with limits of not less than \$5,000,000 per occurrence, an aggregate limit of not less than \$5,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$5,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
2. Automobile liability insurance in respect of vehicles that are required by law to be insured under a contract by a Motor Vehicle Liability Policy, shall have limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property, covering all vehicles owned or leased by the *Contractor*. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.
3. Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft (if used directly or indirectly in the performance of the *Work*), including use of additional premises, shall have limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof and limits of not less than \$5,000,000 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*.
4. "Broad form" property insurance shall have limits of not less than the sum of 1.1 times *Contract Price* and the full value, as stated in the *Contract*, of *Products* and design services that are specified to be provided by the *Owner* for incorporation into the *Work*, with a deductible not exceeding \$5,000. The insurance coverage shall not be less than the insurance provided by IBC Forms 4042 and 4047 (excluding flood and earthquake) or their equivalent replacement. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
5. Boiler and machinery insurance shall have limits of not less than the replacement value of the permanent or temporary boilers and pressure vessels, and other insurable objects forming part of the *Work*. The insurance coverage shall not be less than the insurance provided by a comprehensive boiler and machinery policy.
6. "Broad form" contractors' equipment insurance coverage covering *Construction Equipment* used by the *Contractor* for the performance of the *Work*, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance, the *Owner* may agree to waive the equipment insurance requirement.
7. Standard Exclusions
  - 7.1 In addition to the broad form property exclusions identified in IBC forms 4042(1995), and 4047(2000), the *Contractor* is not required to provide the following insurance coverage:
    - Asbestos
    - Cyber Risk
    - Mould
    - Terrorism

**THESE SUPPLEMENTARY GENERAL CONDITIONS AMEND THE DEFINITIONS AND  
GENERAL CONDITIONS**

**DEFINITIONS**

- .1 Page 6, delete Definition 7 and replace with the following new definition:
7. The Contract Price shall be the sum of the products of the actual final quantities that are incorporated in, or made necessary by the Work, as confirmed by count and measurement, multiplied by the appropriate Unit Prices from the Tender Form together with any adjustments that are made in accordance with the provisions of the Contract Documents plus the amount of Government Sales Tax. When a Lump Sum Stipulated Price form the basis of payment, the Contract Price is as stated in the Form of Agreement, Article A-4, plus the amount of Government Sales Tax.

**GENERAL CONDITIONS OF CONTRACT**

**.1 GC 2.4 – DEFECTIVE WORK**

Page 11, clause 2.4.3, add the following sentence at the end of the clause:

“If the Consultant determination is not accepted by either party, then the matter shall be settled in accordance with the requirements of Part 8 of the General Conditions – DISPUTE RESOLUTION.”

**.2 GC 3.7 – LAYOUT OF THE WORK**

Page 13, delete clause 3.7.1 in its entirety and replace with the following:

- 3.7.1 Before the work of the Contract begins, the Owner’s Representative will, once only, provide the data for sufficient reference points to identify the Works on the ground. The Contractor shall have all reference points established on site by a licensed surveyor, at the place of the Work, at no additional cost to the Owner.

**.3 GC 3.8 – SUBCONTRACTORS AND SUPPLIERS**

Page 13, after clause 3.8.2, add the following:

- 3.8.2 The Contractor shall employ those Subcontractors or Suppliers who were named in Section 00 41 44 for the performance of a portion of the Work.



**.4 GC 3.11 – SHOP DRAWINGS**

Page 14, clause 3.11.4, delete second sentence and replace to read:

“Contractor shall prepare and jointly review with Consultant a schedule of dates for submission of shop drawings.”

**.5 GC 5.4 – BASIS OF PAYMENT FOR COST PLUS WORK**

Page 16, after clause 5.4.1, add the following:

5.4.3 The actual cost of equipment rental shall be in accordance with the Province of Prince Edward Island Machinery Rental Rates.

Page 16, after clause 5.4.2, add the following:

5.4.3 The percentage fee as stated in clause 5.4.1 shall be two percent (2%) of the cost plus work, but shall not be applied to the cost of construction equipment when such cost is based on rates which already include overhead and profit.

**.6 GC 5.5 – APPLICATIONS FOR PROGRESS PAYMENT**

Page 17, after clause 5.5.6, add the following:

5.5.7 Vendors are advised that the City has now moved to electronic payments on goods and services provided to the City. Payment of invoices will be made by way of Electronic Funds Transfer. The successful proponent will be required to provide the necessary banking information for registration on the City's system.

**.7 GC 5.6 – PROGRESS PAYMENT**

Page 18, in clause 5.6.1, line 1, change “5 working days” to read “10 calendar days” and in line 2, change “GC5.2” to read “GC 5.5”.

Page 18, delete clause 5.6.2 in its entirety and replace with the following:

5.6.2 The Owner shall make payment to the Contractor on account as provided in Article A-5 of the Agreement – PAYMENT on or before twenty (20) calendar days after the later of:

- .1 receipt by the Consultant of the application for payment; or
- .2 the last day of the monthly payment period covered by the application for payment.

Page 18, after clause 5.6.3, add the following additional clause:

- 5.6.4 The Contractor shall pay promptly any and all accounts for labour, services and materials used for the purpose of the fulfillment of this Contract as and when such accounts become due and payable and shall furnish the Consultant with proof of payment of such accounts in such form and as often as the Consultant may request.

**.8 GC 5.7 – SUBSTANTIAL PERFORMANCE OF THE WORK**

Page 18, after clause 5.7.4, add the following additional clause:

- 5.7.5 Fifteen (15) days before the Contractor submits the application for Substantial Performance of the Work, all Operations and Maintenance Manual materials shall be submitted to the Consultant in accordance with the Contract Documents. The Certificate of Substantial Performance will not be issued until the Consultant received the required documents.

**.9 GC 5.8 – PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK**

Page 18, after clause 5.8.1.2, add the following:

- 5.8.1.3 Submit a clearance letter from the Workers' Compensation Board.
- 5.8.1.4 All such documents shall be dated not earlier than the expiry of the lien period.

Page 18, delete clause 5.8.3 in its entirety, renumber subsequent clause.

Page 18, add new clause 5.8.4 as follows:

- 5.8.4 If, within 60 days after the issue by the Consultant of the Certificate of Substantial Performance, the Contractor has not corrected all the deficiencies, the Owner shall retain sufficient money to cover the cost of completing said deficiencies, as determined by the Consultant, in addition to holding monies retained in accordance with the provisions of this Contract and subject to the provisions of the Mechanics' Lien legislation of P.E.I.

**.10 GC 5.10 – FINAL PAYMENT**

Page 19, delete clause 5.10.1 in its entirety and replace with the following:

- 5.10.1 When the Contractor considers that the Work is completed, the Contractor shall submit an application for final payment. The Contractor's application for final payment is considered to be valid when:
- .1 Work has been completed in compliance with the Contract Documents and the Consultant is satisfied that all the

- requirements of the Contract have been fulfilled by the Contractor.
- .2 Defects have been corrected and deficiencies have been completed.
- .3 Equipment and systems have been tested, adjusted and balanced and are fully operational and written reports as outlined in the Contract Documents have been provided to the Consultant.
- .4 Certificates required by utility companies, manufacturer's representative and inspectors have been submitted.
- .5 Spare parts, maintenance materials, warranties and bonds have been provided.

5.10.2 If Work is deemed incomplete by the Consultant, complete outstanding items and request re-inspection.

5.10.3 If, in the opinion of the Consultant, it is not expedient to correct defective work or work is not performed in accordance with the requirements of the Contract, the Owner may deduct from the Contract Price the difference in value between work performed and that called for by the Contract Documents, the amount of which shall be determined by the Consultant.

Page 19, renumber existing clauses 5.10.2, 5.10.3 and 5.10.4 to 5.10.4, 5.10.5, and 5.10.6 respectively. In renumbered clause 5.10.6, change "5 working days" to read "20 calendar days".

#### **.11 GC 6.2 – CHANGE ORDER**

Page 20, add new clause 6.2.4 as follows:

- 6.2.4 If the method of adjustment of the Contract Price presented by the Contractor is a lump sum or a unit price quotation as indicated in 6.2.2.2, the mark-up on changes shall be as follows:
- .1 Work performed by Contractor's own forces: cost plus ten percent (10%) overhead plus ten percent (10%) fee.
  - .2 Work performed by Subcontractor's forces: cost plus ten percent (10%) overhead plus five percent (5%) fee.

#### **.12 GC 6.3 – CHANGE DIRECTIVE**

Page 20, in clause 6.3.8, add the following sentence at the end of the paragraph:

"If such determination by the Consultant is not accepted by either party, then the decision shall be made in accordance with Part 8 of the General Conditions – DISPUTE RESOLUTION."

#### **.13 GC 6.5 – DELAYS**

Page 21, clause 6.5.2, delete last sentence of paragraph and replace with the following

sentence:

“The Contractor will not be reimbursed by the Owner for costs incurred by the Contractor as a result of such delay.”

**.14 GC 9.5 – CONSTRUCTION SAFETY**

Page 27, after GC 9.5.1, add the following:

9.5.2            W.H.M.I.S. – Workplace Hazardous Materials Information Systems & Hazardous Products Act – Government of Canada Regulations under the Hazardous Products Act and the regulation regarding the handling and storage of hazardous materials must be complied with (reference: Regulation 88-221). These regulations stipulate that employees must be trained in the proper handling of workplace hazardous material.

**.15 GC 10.1 – TAXES AND DUTIES**

Page 28, add new clause GC 10.1.3 as follows:

10.1.3            The Contractor shall indicate on each application for payment, as a separate amount, the appropriate Government Sales Tax that the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract.

**.16 GC 10.2 – LAWS, NOTICES, PERMITS AND FEES**

Page 28, in paragraph 10.2.3, add new sentences to end of paragraph as follows:

“Various jurisdictions have requirements for posting non-refundable fees before excavations are carried out within public rights-of-way. The Contractor is responsible for the determination of the requirement for each specific project and for any required deposits.”

**.17 GC 11.1 - INSURANCE**

Page 29, delete GC 11.1 in its entirety and replace with Section 00 72 10 – Insurance Requirements.

**.18 GC 11.2 - CONTRACT SECURITY**

Page 30, delete GC 11.2.1 in its entirety and replace with the following:

11.2.1            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 Contract Price (including HST). Should it

become apparent that the final cost of the project will exceed the Estimated Amount Due by more than 10%, the Contractor shall arrange to have his bonds reissued, based on the projected final cost.

Page 30, add new clause GC 11.2.3 as follows:

- 11.2.2 As an alternate to Performance and Labour and Material Payment Bonds, the Contractor may provide security in the form of certified Cheque or irrevocable letter of credit in the amount of 10% of the tender price (including HST).

Page 30, add new clause GC 11.2.4 as follows:

- 11.2.4 The Contract Security will be retained until the expiration of the Period of Maintenance.

## **.19 GC 12.3 – WARRANTY**

Page 32, add new clause GC 12.3.7 as follows:

- 12.3.7 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.

## **.20 GC 13.1 TIME FOR COMPLETION**

- 13.1.1 The Works shall be completed by the date indicated in the Article A-1 of the Agreement Between Owner and Contractor. The Date for Completion shall be the time to complete the Work given in the Tender Form.

## **.21 GC 14.1 LIQUIDATED DAMAGES**

- 14.1.1 Time shall be construed as being of the essence of the Contract.
- 14.1.2 Should the Contractor fail to complete the works by the Date for Completion, the period of time from the Date for Completion to the Date of Substantial Performance of the Works as determined by the Consultant, shall be termed the Period of Delay.
- 14.1.3 In the event of there being a Period of Delay, the Contractor shall be liable for and shall pay to the Owner the cost of continuance of supervision during the Period of Delay, and all additional fees, disbursements and costs incurred by the Owner by reason of there being such period of delay for each and every day that the work or works shall

remain unfinished after the time so specified. The said sum or sums in view of the difficulty of ascertaining the losses which the Owner may suffer by reason of delay in the performance of the said Works, is hereby agreed upon, fixed and determined by the parties hereto as liquidated damages that the Owner will suffer by reason of said delay and default and not as penalty. The Owner may deduct the amount of such liquidated damages from each progress payment following the event until the project reaches Substantial Performance as certified by the Consultant.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION OF WORK**

- .1 The work to be done and list of contract drawings are set forth in Section 00 21 10 - Description of Work and List of Drawings.

### **1.2 FAMILIARIZATION**

- .1 Bidders shall inspect and examine the site and its surroundings before submitting a tender. A Bidder who submits a tender is deemed to be satisfied as to the nature of the ground and subsoil, the form and nature of the site, the quantities and nature of the work, the materials necessary for the completion of the work, the means of access to the site, any accommodation which may be required, and in general to have obtained all necessary information as to the proposed Work and as to any risks, contingencies and other circumstances affecting the Work.
- .2 The Bidder shall be deemed to have satisfied itself before submitting a Tender as to the correctness and sufficiency of the Tender and the prices entered in the Form of Tender of the Contract Specifications, and such prices shall be deemed to cover and include all obligations under the Contract.

### **1.3 REFERENCE CODES AND STANDARDS**

- .1 Perform work in accordance with Code of Practice of the Department of Labour, as it pertains to the Temporary Workplace Traffic Control Manual (PEI Department of Transportation and Infrastructure) and any other code of Federal, Provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM) and other standards organizations. These Standards will 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.
- .3 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

### **1.4 INTERPRETATION OF DOCUMENTS**

- .1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

### **1.5 TERM ENGINEER OR OWNER'S REPRESENTATIVE**

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

**1.6 DATUM**

- .1 All levels shown on the Drawings are referred to the Canadian Geodetic Datum. Verify all elevations prior to commencing work.

**1.7 SETTING OUT OF WORK**

- .1 The Contractor shall furnish and set stakes, marks and furnish data as deemed necessary to establish lines, grades and measurement required for the Work.
- .2 The Owner's Representative will establish two permanent survey control points on site for the Contractor's use. Contractor shall record locations, with horizontal and vertical data in Project Record Documents. The Contractor shall be responsible for the preservation of all survey reference points and control points.
- .3 The Contractor shall maintain these, and/or re-establish points as required during the Contract period.
- .4 Supply such devices as straight edges and templates required to facilitate Owner's Representative's inspection of work.
- .5 Supply stakes and other survey markers required for laying out work.
- .6 Before commencing the Work, the Contractor shall verify the accuracy of all layout and/or drawing files provided by the Owner's Representative at the start of the Work and notify the Owner's Representative of any discrepancies. If discrepancies are found, the Owner's Representative will correct them within three (3) Working days. No claims will be entertained for inaccuracies after the Work has commenced.
  - .1 The Contractor may be required to convert the electronic design files to a format compatible with own survey equipment. Manipulation of the electronic design files is at the Contractor's own risk.
  - .2 Digital design model information may not exist for all areas, such as transitions for intersecting roadways, and all layers, such as aggregate base/subbase. Contractor shall calculate grades and offsets and may be required to place stakes for these areas.
  - .3 The Owner's Representative will provide updated electronic data whenever there are significant changes to the design, as determined by the Owner's Representative, which would affect the finished grade. For minor grade changes, (i.e. matching existing conditions or adjusting backslope/foreslope ratios to match soil conditions), the Contractor shall perform all Work required for the adjustment and place stakes and marks to the satisfaction of the Owner's Representative.
- .7 The Contractor is responsible to retain a Land Surveyor, acceptable to the City, currently licensed to practice in the Province of Prince Edward Island, to replace any property markers or monument that are disturbed by the Contractor. Failure to do so within two (2) weeks of receiving notice from the Owner's Representative shall result in the City having the work done with costs deducted from any monies owed to the Contractor.



**1.8 AS BUILT INFORMATION**

- .1 The as-built and record drawing information shall be neatly recorded as outlined in Section 01 77 00 – Closeout Procedures. The as-built and record drawing information shall be submitted to the Owner's Representative within thirty (30) working days of the completion of construction.

**1.9 MEASUREMENT FOR PAYMENT**

- .1 Notify Owner's Representative sufficiently in advance of operations to permit required measurements for payment.

**1.10 MAINTENANCE OF WORK DURING CONSTRUCTION**

- .1 Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that the roadway or structures are continuously kept in a condition satisfactory to Owner's Representative.
- .2 Waste material and rubbish shall not be allowed to accumulate and shall be removed from site daily or at regular intervals as agreed upon by the Owner's Representative. Waste material and rubbish shall not be buried in the trench or street excavation. It shall be properly disposed of by the Contractor.
- .3 The site as much as practicable must be kept in a clean and orderly appearance and free from excess material at all times. The Contractor must clean up the site periodically and keep it graded smooth as work progresses to the complete satisfaction of the Owner's Representative. Keep pavement and areas adjacent to site clean and free from mud, dirt and debris at all times.
- .4 Upon completion of the job all surplus construction materials, all tools, equipment, temporary structures, etc. will be removed from the site by the Contractor to the satisfaction of and in accordance with any directions of the Owner's Representative. All dirt, rubbish, trash, etc. becomes the property of the Contractor and must be removed from the site.
- .5 The Contractor must provide a minimum 50mm of Class 'A granular material on the excavated roadway within two (2) days after excavation to facilitate public travel.

**1.11 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each of following:
  - .1 Contract drawings.
  - .2 Specifications.
  - .3 Addenda
  - .4 Reviewed drawings.
  - .5 Change orders.
  - .6 Other modifications to Contract.
  - .7 Copy of approved work schedule.

**1.12 SITE CONDITIONS**

- .1 The Contractor will be responsible to visit the site and review existing site conditions.

**1.13 DELIVERY OF MATERIALS**

- .1 The Contractor will arrange for early deliveries of materials necessary to the execution of the Work and will have them on hand well in advance of the time they are actually required.

**1.14 CONSULTANT**

- .1 Consultant can be contacted at:

EXP Services Inc.  
555 Mapleton Road, Suite 100  
Moncton, NB E1G 2K5  
Telephone: (506) 381-1567  
Email: [david.kozak@exp.com](mailto:david.kozak@exp.com)  
Mobile: (506) 381-1567

**1.15 SITE TRAILER**

- .1 If an office on site is required, provide at own cost. No interior office space will be given to the Contractor.

**1.16 WORK SCHEDULE AND PROJECT MEETINGS**

- .1 Provide to the Owner's Representative in writing and within five (5) working days after Contract execution and not later than four (4) days prior to the pre-construction meeting, a detailed construction schedule and traffic control plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work in the Unit Price Table.
- .2 After receiving the Contractor's plan and prior to start of construction, a pre-construction meeting involving Contractor and Owner's Representative will be held at a place and time to be determined by the Owner's Representative. This meeting will review implications of the contract, design, schedule of Work, methods of construction, environment protection methods and traffic control.
  - .1 Agenda to include the following:
    - .1 Appointment of official representative of participants in the Work.
    - .2 Establish project coordination meeting frequency and required attendees.
    - .3 Schedule of Work, showing key milestones such as equipment/material delivery dates and substantial completion date.
    - .4 Schedule of submission of shop drawings and samples.

- .5 Requirements for temporary facilities, site sign, office, storage sheds, utilities, fences and laydown area.
- .6 Security requirements will be reviewed.
- .7 Discuss process for payment clauses, changes and other administrative requirements.
- .8 Owner-furnished products.
- .9 Insurance certificates and permits.
- .10 Hours of Work and site supervision requirements.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Owner's Representative and schedule updated by Contractor in conjunction with and to approval of Owner's Representative.
- .4 No work will begin until the pre-construction meeting is held.
- .5 Following the pre-construction meeting and approval of the schedule and traffic control plan, the Work will be so scheduled to meet the time restraints and have the project completed on time.

#### 1.17 **SANITARY SERVICES**

- .1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Owner's Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes and authorities.

#### 1.18 **CONTRACTOR'S USE OF SITE**

- .1 Use of site: for execution of work within roadway right of way and those areas specified by the Owner's Representative.

#### 1.19 **EXISTING CONDITIONS**

- .1 Carry out work at times directed by authorities having jurisdiction. Disturbance to pedestrian, cyclist and vehicular traffic shall be kept to a practical minimum as per the construction phasing and traffic control notes in the Drawings.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Owner's Representative of findings.
- .3 Submit schedule to and obtain approval from Owner's Representative for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Owner's Representative and confirm findings in writing.
- .5 Record locations of maintained, re-routed and abandoned service lines.
- .6 Ensure that at least one lane of traffic is maintained at construction sites at all times, except as noted in the Drawings.

- .7 Ensure pedestrian, cyclist and other traffic is not unduly impeded, interrupted or endangered by execution or existence of work or plant. Access to businesses must be maintained at all times during the project. The Contractor is responsible for scheduling the work to permit access to all businesses during normal business hours.
- .8 Maintain existing signs at all times. When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area. The work is considered to be incidental and no separate payment will be made for maintaining or moving signs.
- .9 Verify locations of any underground utilities.

#### 1.20 **RESTRICTIONS**

- .1 This Subsection identifies restrictions that may impact the scheduling or execution of the Work. This does not purport to identify all potential disruptions, but rather it is meant to assist the Contractor to understand the project.
- .2 Be fully aware that the Owner and neighbouring land owners will occupy premises during the entire construction period for execution of normal operations. Co-operate with Owner in scheduling work to minimize conflict and to facilitate Owner's operation and maintenance activities.
  - .1 The existing street is a fully functional neighbourhood. Working areas must remain reasonably clean and attention to dust control and prevention of excessive debris must be paid.
- .3 Work of this Contract is located in an area where normal working hours are:
  - .1 7:00am to 7:00pm, Monday to Friday inclusive.
  - .2 Work performed outside these hours require approval by the Owner. Request approval in writing at least 48 hours in advance.
- .4 The Contractor is required to notify the Owner's Representative in writing 72 hours in advance when necessary interruption of water or sanitary services are required during the construction.

#### 1.21 **NIGHT, SATURDAY, SUNDAY AND HOLIDAY WORK**

- .1 The Owner's Representative may order or the Contractor may request work to proceed in whole or in part at night, on Saturdays, Sundays or holidays if it is deemed necessary or expedient in order to preserve and maintain traffic over or on any street or road, or to complete any works that are of an urgent nature, or to complete works which could cause significant daytime disruptions to residents and businesses (i.e. water supply interruption). Such night or overtime work shall be performed by the Contractor without additional or extra cost to the City beyond the price bid for the work.
- .2 No Sunday work will be permitted, except in the case of emergency and then only with the written permission of the Owner's Representative and to such extent as may be necessary.

- .3 The Contractor shall, as far as possible, refrain from work on statutory holidays in the Province of Prince Edward Island. If work must be carried out on such a holiday written notification must be submitted to the Owner's Representative at least four (4) days in advance of such holiday stating those places where work will be conducted and what engineering assistance may be required. If the Contractor fails to give such notice in advance of any holiday, such failure shall be considered as an indication that no work requiring the presence of the Owner's Representative is to be done by the Contractor on such a holiday.

## 1.22 TESTING

- .1 Pay for the services of testing laboratory:
  - .1 Inspection and testing required by laws, ordinances, rules and regulations.
  - .2 Tests specified to be performed by Contractor.
  - .3 Inspection and testing performed exclusively for convenience of Contractor.
  - .4 Testing, adjustment and balancing of process, mechanical and electrical equipment systems.
  - .5 Testing to ensure a safe work environment for employees or subcontractors employed by the Contractor.
- .2 Provide such assistance, labour and materials as are normally required for examining, measuring and testing the quality, weight or quantity and pay all costs of any material used, and supply samples of materials before incorporation in the Works for testing as may be selected and as specified.
- .3 Perform or arrange for the performance of all tests on all equipment in complete accordance with the relevant clauses of these Specifications and in the presence of the Owner's Representative.
- .4 The cost of providing assistance, samples, etc., for testing and of performing or arranging tests shall be deemed to be covered by and included in the Contract Price unless noted otherwise, elsewhere in these Specifications.
- .5 The Contractor shall have no claim against the Owner or the Owner's Representative in respect of any financial loss which may be suffered from the rejection of any materials or equipment due to their failure to meet specified test requirements, and the Contractor shall also 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 Owner's Representative.

## 1.23 NOISE AND VIBRATION

- .1 Operate construction equipment such that there is a minimum amount of noise and vibration. Should excessive noise and vibration be caused, at own expense, rectify the same to the approval of the Owner's Representative.

#### 1.24 LIGHTING AND BARRICADES

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

#### 1.25 UTILITY INSTALLATIONS

- .1 It is to be noted that certain underground and overhead facilities are located along the construction route and it will be the responsibility of the Contractor to maintain liaison with the Utility authorities to ensure that no damage is affected to these facilities. The Contractor shall note that hand excavation may be required around underground utilities.
  - .1 Locating and accommodating all existing infrastructure, costs associated with liaising with all utilities and departments (Charlottetown Water and Sewer Utility, Enwave Energy PEI, Bell Aliant, Eastlink, Maritime Electric and UCC Utility Corridor) to locate the existing systems, protect, relocate, restrain and accommodate them during construction and maintain service to customers, and return systems all to the satisfaction of the Utility shall not be measured for payment and shall be considered as incidental to the Works.
- .2 This includes, but is not limited to all water pipes, sewer pipes, gas mains, culverts, conduits, telecommunication cables and electric power lines, etc. The approximate location of known facilities may be shown on the plans in so far as possible and based on the best available information at the time. However, the City accepts no responsibility for the accuracy or completeness of this information.
- .3 No claim will be entertained for any damage or any slowdown of work due to the aforementioned Utilities.
- .4 The Contractor shall ensure that they make provisions for safe working conditions while operating near live power lines. The Contractor has sole responsibility to have the Utility place required safety coverings over power lines, hold poles, suspend lines, etc. at the Contractor's expense. Contractors are advised to review these costs with the Utility prior to the submission of their tender. All costs are deemed to be included in the contract unit prices quoted in the tender submission.
- .5 The existing utilities must be protected at all times from the Contractor's construction operations. The Contractor shall take into consideration their presence and any activities which will affect it shall be considered and the Contractor shall take the necessary steps to protect it at all times. All costs associated with locating, excavation, protection of the underground facilities (including temporarily supporting new or existing facilities to install municipal infrastructure), shall be considered incidental to the Works.

- .6 The Contractor will be required to daylight the existing underground facilities using a hydro vacuum truck. Once the systems are located by hydro vacuum excavation, excavating equipment may be used to widen the working space beneath the structure, and to each side. Whenever excavating is performed within 1 metre of the buried facilities, the ground shall only be excavated by hand digging.
- .7 The Contractor shall ensure that they make provisions for safe working conditions while operating near live power, phone or utility lines. The Contractor has sole responsibility to have the Utility place required safety coverings over power lines, hold poles, suspend lines, etc. at the Contractor's expense. Contractors are advised to review these costs with the Utility prior to the submission of their tender. All costs are deemed to be included in the contract unit prices quoted in the tender submission.
- .8 In the event that damage to existing facilities occur, stop operations immediately and report the location of damaged cable to the appropriate Utility or to the Owner's Representative. At no time shall unauthorized persons attempt to move splice or repair damaged facilities.

**1.26 CONNECTIONS TO OR CONFLICT WITH OTHER UTILITIES OR STRUCTURES**

- .1 It may be necessary for the Contractor to make connections to lines which are controlled by another utility company other than the City. In such event, the Contractor will carry out such connection in accordance with the specific instruction of the representative utility concerned, or pay for the services rendered by the utility company.
- .2 Certain underground and aboveground facilities may be located along the construction route and it is the responsibility of the Contractor to maintain liaison with the appropriate utility authorities to ensure that no damage is affected to these facilities. The Contractor shall also be responsible to request that the underground utilities be located and marked out in the field prior to commencement of construction. This includes, but is not limited to, all water, sewer, gas pipes, oil pipelines, culverts, all telephone, telegraph, electric power lines, cables, poles, fibreoptics, conduits, etc.
- .3 The approximate location of the facilities may be shown on the Drawings, but the Owner's Representative accepts no responsibility for the accuracy or completeness of this information.
- .4 Any damage caused to any water and sewer pipes, catch basins pipes, culverts, etc., will be immediately repaired by the Contractor. The Contractor will bear the cost of all repairs to any pipe that is shown on the Drawings or is readily visible or is marked out on the Site.
- .5 No claim will be entertained for any damage or any slowdown of work due to any involvement with the aforementioned utilities.

**1.27 TEST PITS**

- .1 Costs associated with excavating test pits prior to installation to locate infrastructure at crossing points with the proposed infrastructure shall not be measured for payment and shall be considered as incidental to the Works.

**1.28 MAINTENANCE OF EXISTING SEWER LATERALS AND MAINS**

- .1 The Contractor shall ensure that the existing sanitary sewers, storm sewers, culverts and service laterals remain functional during construction. The Contractor shall make temporary connections as necessary to ensure continued operation of the existing systems in advance of periods of inactivity on site greater than 24 hours and in advance of forecast periods of rainfall exceeding 10 mm in 24 hours.

**1.29 ADDITIONAL DRAWINGS**

- .1 Owner's Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract Documents.

**1.30 RELICS, ANTIQUES AND WILDLIFE HABITAT**

- .1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of Work.
- .2 Give immediate notice to Owner's Representative and await Owner's Representative's written instructions before proceeding with Work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

**1.31 WORKING NEAR EXISTING TREES AND SHRUBS**

- .1 The Contractor shall use care and caution while working adjacent to existing City or private trees or shrubs in the path of water, sewer, curb, sidewalk and road construction. If the root structure of a tree or shrub is encountered, the Contractor must immediately contact the Owner's Representative for inspection of the roots, and for procedures for preserving the tree or shrub.

**1.32 MEASUREMENT OF QUANTITIES**

- .1 Linear:
  - .1 Items which are measured by metre (m) or kilometre (km), such as pavement markings will be measured along centreline of installation unless otherwise shown on plans.
- .2 Area:
  - .1 Longitudinal and transverse measurements for areas to be measured horizontally in metres (m).



- .2 Longitudinal and transverse measurements for such items as topsoil and hydroseeding to be made on actual flat or sloped surface seeded or sodded.
- .3 Volume:
  - .1 In computing volumes of excavation, average end area method will be used unless otherwise directed by Owner's Representative in writing.
  - .2 Term: cubic metres or C.M.
  - .3 All volume measurements refer to in place measure unless specified elsewhere in specification.
- .4 Mass:
  - .1 Term "tonne" shall mean 1000 kg.
  - .2 Materials which are specified for measurement by mass shall be weighed on scales approved by and at locations designated by Owner's Representative. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale-house.
- .5 Time:
  - .1 Unless otherwise provided for elsewhere or by written authority of Owner's Representative, hourly rental of equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to register hours of operation. Devices which only measure hours of running of motor will not be accepted. Cost for operator of equipment will be included in the hourly rate.

### 1.33 TRUCK ROUTES

- .1 All heavy equipment, including trucks, hauling imported material or empty, shall use a designated City truck route where possible, otherwise shall proceed to and from the work Site by taking the shortest route to and from the nearest City truck route. Route to be used shall be approved by the Owner's Representative.

### 1.34 WEIGHT CERTIFICATES

- .1 Electronic weight certificates shall contain, at a minimum: the date, the contract number (and/or work description), truck number / license plate, material type/class/size, actual gross weight, maximum allowable gross weight, tare weight, net weight, space for weigher's signature, space for checker's signature, and station(s).
  - .1 Hand written weight certificates may result in the rejection of payment by the Owner's Representative.
  - .2 Failure to provide the required information on weight tickets may result in the rejection of the load, and the truck being turned away from the work site.

- .2 The Contractor shall be responsible for ensuring that the truck weigh certificates for each load are handed to the Owner's Representative at the time the delivery truck unloads at the site. The Owner's Representative will not accept any responsibility for delivery tickets that are not submitted at the proper time, or are submitted in groups after the delivery trucks have left the site.

#### 1.35 PERMITS / AUTHORITIES

- .1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Owner prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all charges in connection therewith.
- .2 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Owner prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all charges in connection therewith.

#### 1.36 EQUIVALENTS AND ALTERNATES

- .1 Where any particular brand of manufactured article 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 Owner's Representative. 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.
- .2 When the Owner 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 Owner's Representative but only after price adjustments have been negotiated and approved by the Owner's Representative.
- .3 If the alternative requires modifications, adjustments or additions to the specified works, submit to the Owner's Representative, drawings and specifications for these modifications, adjustments or additions in the same detail as presented in the Contract. Approval in principle by the Owner's Representative of these modifications, adjustments or additions in no way relieves the Contractor of obligations or liabilities under the Contract to provide for finished piece of work complete and operational in all essentials.
- .4 No change or substitution can be made without the written consent of the Owner's Representative.

- .5 The Owner's Representative 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 Owner's Representative accepts a proposed substitute, reimburse the City for the charges of the Owner's Representative for evaluating any proposed substitute.

#### 1.37 EQUIPMENT RENTAL RATES

- .1 Upon written request, the Contractor will supply the Owner's Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the PEI Department of Transportation and Infrastructure.

#### 1.38 PHOTOGRAPHS

- .1 Prior to the commencement of the Work, the Owner's Representative may arrange for photographs to be taken of the site of the Work and those properties adjacent to the site of the work. Be present or have an authorized representative 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, etc., as determined by mutual agreement between the Contractor and Owner's Representative, will be retained by the Owner's Representative as a record of site conditions prior to commencement of Work.

#### 1.39 ASSISTANCE TO THE OWNER'S REPRESENTATIVE

- .1 During the continuance of the Contract, provide the necessary labour and tools to assist the Owner's Representative in measuring, checking, testing and examining the 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.

#### 1.40 RELATIONS WITH OTHER CONTRACTORS

- .1 Wherever work being done by the Owner's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Owner's Representative to secure the completion of the various portions of the work in general harmony.
- .2 If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report to the Owner's Representative any defects in such work that render it unsuitable for such proper execution and results and his failure to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper for the reception of his work except as to defects which may develop in the other contractor's work after the execution of this work.
- .3 To ensure the proper execution of his subsequent work, the Contractor shall measure work already in place and shall at once report to the Owner's Representative any discrepancy between the executed work and the drawings.

**1.41 CO-OPERATION**

- .1 It is to be noted that other work may be in progress under various contracts within the working area of this contract. The Contractor will, to the satisfaction of the Owner's Representative, allow the other contractors reasonable access to the work and will co-operate with them in the carrying out of their duties and obligations.
- .2 No claim will be entertained for any inconvenience or any slowdown in work due to these other Contracts.

**1.42 DETERMINATION OF COMPLETION DATE**

- .1 The whole of the works shall be completed within the time stated in the Tender or as calculated from the date of award of tender by City Council, using the number of working days as originally provided for.
- .2 The City will consider requests for extension to the completion date of the Contract, due to adverse weather conditions, extra or additional work, disasters or delay in delivery of equipment or material, on the following basis:
  - .1 The Contractor shall give notice in writing to the Owner's Representative within ten (10) working days after any such delay has first arisen stating the reason and requesting a stated extension of time.
  - .2 Providing the Contractor commences the work in accordance with an approved schedule of work, additional working days will be granted for each and every working day lost due to weather conditions if the number of hours lost during any one day exceeds fifty percent (50%) of the normal working hours.
  - .3 Working days lost due to weather conditions will be determined by the Owner's Representative and this information will be given to the Contractor at the end of each week.
  - .4 Additional working days will be granted for extra or additional work performed, provided the Contractor can show the additional or extra work could not be carried out without interfering with the original Schedule of Work.
  - .5 Additional working days may be granted for delay in delivery of equipment or material provided the Contractor can furnish documentation attesting to the delay being claimed.
  - .6 If the Contractor does not agree with the figures compiled by the Owner's Representative, the Contractor must make his objections with reasons, in writing, within ten (10) days of receipt of the Owner's Representative's notification, after which, the figures compiled by the Owner's Representative shall be binding.

**1.43 CONSTRUCTION SALVAGE AND HANDLING**

- .1 Protect existing illuminated special overhead crosswalk poles, truss arms, signs and related equipment designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Owner's Representative and at no cost to the City.

- .2 Remove and store materials to be reused or salvaged, in manner to prevent damage.
- .3 Store and protect in accordance with requirements for maximum preservation of material.
- .4 All salvaged materials to be delivered to City of Charlottetown Public Works.

#### 1.44 **CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

- .1 Keep work, property, road surfaces, etc. in vicinity of the Works and in areas where 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 condition that meets the approval of the Owner's Representative. The Contractor shall be responsible for sweeping and removing all foreign matter from the site or trucking routes that have had material deposited from the works.
  - .1 The Contractor shall be prepared to sweep and remove all foreign matter from the site or trucking routes on a seven-day-per-week basis as required and/or at the request of the Owner's Representative.
  - .2 The sweeping and removal of all foreign matter from the site or trucking routes shall be considered as incidental to the work; failure to comply within 24 hours of Owner's Representative requests for compliance will result in the City having the work carried out whenever necessary, with the costs of such being deducted from the first release of holdback.
- .4 Do not dispose of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways.
- .5 Dispose of debris and waste materials in accordance with the latest regulations respecting Solid Waste Products Resource Management issued by PEI Department of Environment, Energy and Climate Change at no additional cost to the Contract.
- .6 Dispose of all construction and demolition waste at an approved C&D waste disposal site.
- .7 Where possible, divert construction and demolition waste to the appropriate recycling facilities. Minimize waste generated by the Work.

#### 1.45 CONTRACTOR'S WORK FORCE

- .1 The Contractor shall employ as many and such persons as necessary to complete the Works within the contract time and shall cease to employ on the works any foreman or person who, in the opinion of the Owner's Representative, has not demonstrated ability or is negligent and shall not re-employ any such foreman or person on the works without the written consent of the Owner's Representative.

#### 1.46 INCLEMENT WEATHER

- .1 During unsuitable weather, when in the opinion of the Owner's Representative, the conditions are unfavourable for good work, construction shall cease. All work must be protected by the Contractor at his own expense. Allowances for work days missed due to inclement weather will be as per Clause 1.42, "Determination of Completion Date".

#### 1.47 PUBLIC CONVENIENCE

- .1 During the progress of the works, the convenience of the public and the residents affected by the construction must be provided for. Convenient access to driveways, homes and buildings along the street must be maintained wherever possible. Pedestrian access past the site must be maintained in order to ensure the safe and proper re-routing of pedestrians. Access to commercial, institutional and specifically designated properties must be maintained at all times.
  - .1 Temporary gravels, walkways, handrails, markers and other means will be taken to provide safe, clean access to all areas requiring routine access.
  - .2 Convenience and good public relations with the residents, where possible, must be maintained by all persons involved with the works.
- .2 The Contractor shall ensure that adequate dust control is provided at all times during the Contract to avoid any hazardous situations and shall immediately implement any measures as directed by the Owner's Representative to control dust problems. Any damages or costs incurred as a result of excessive dust shall be paid for by the Contractor.
  - .1 The Contractor shall be prepared to apply water on a seven-day-per-week basis as required and/or at the request of the Owner's Representative.
  - .2 The supply and application of water for control of dust pollutants shall be considered as incidental to the work; failure to comply will result in the City having the work carried out whenever necessary, with the costs of such being deducted from the first release of holdback.
- .3 No material or other obstruction shall be placed within ten (10) metres of fire hydrants, which must at all times be readily accessible to the Fire Department.

**1.48 NOTIFICATION OF OFFICIAL AGENCIES**

- .1 The Contractor shall be responsible for carrying out the Works in strict accordance with all Federal, Provincial and Municipal Laws, Acts, Regulations, by-laws, codes, etc., governing all or any part of the work under this Contract.
- .2 These requirements may affect methods of installation and/or construction and may include written notification and/or permits of the appropriate authority prior to commencement of the Contract. Where written notification and/or permits of the above authorities is required, a copy of the said notification and/or permits shall be submitted to the Owner's Representative.

**1.49 ENVIRONMENTAL COMPLIANCE**

- .1 The City of Charlottetown will obtain the necessary Permit to Construct or Modify Water Supply System or Wastewater Treatment System and Watercourse and the Wetland and Buffer Zone Activity Permit (as required) from the PEI Department of Environment, Energy and Climate Action for all projects, unless noted otherwise. A copy of the certificate, including Conditions of Approval, will be forwarded to the Contractor when the certificate(s) and permit(s) are received. A copy of the certificate must be available on the job site for the duration of the project.
- .2 The Contractor shall adhere to all conditions as outlined in the Certificates and/or Permits issued by the PEI Department of Environment, Energy and Climate Action.
- .3 At no time shall work on the project commence unless all necessary Environmental Approvals, Permits and Certificates have been received by the City of Charlottetown and copies provided to the Contractor.

**1.50 SITE ACCESS**

- .1 During the construction of the Works, the Contractor shall maintain proper access to and within the Site for all persons and vehicles entitled to such access, and shall maintain existing roads and paths in reasonable condition or provide suitable detours. The Site shall, at all times, be kept as clean and in good order as possible and shall, as soon as practicable, be cleared of all surplus construction equipment and material and left clean and in good order to the satisfaction of the Owner's Representative.

**1.51 PUMPING AND DRAINAGE**

- .1 The Contractor shall bear all costs in connection with the dewatering of excavations, the removal of accumulations of water from the finished structures prior to being taken over for use, the pumping and removal of water from existing water or sewer mains where connections are to be made or appurtenances installed, the pumping and diversion of sewage and sludge necessary for the completion of the Works and any other pumping and drainage necessary at the Site for the proper construction and inspection of the Works.

- .2 The Contractor shall make provision for the discharge of any water, whether foul or discoloured, or otherwise in such a manner as shall be satisfactory to the Owner's Representative and to any persons having rights over the lands or watercourses over or down which such water is discharged. The Contractor shall exercise due care to prevent the fouling of streams by persons or animals. The Contractor shall hold the City indemnified against any claim that may be made through non-compliance with this Section.

#### 1.52 FLOTATION

- .1 The Contractor is warned that the ground water table at the Site may on occasion rise to such a level as to cause floatation or other damage to the structures. The Contractor shall observe all precautions against floatation of the structures during construction, and shall be responsible for any damage caused by floatation.

#### 1.53 CARE OF THE WORKS

- .1 From the commencement to the completion of the Works, the Contractor shall take full responsibility for the care and protection thereof, and of all equipment and material(s) delivered to the Site, and of all temporary works required in the construction of the Works.
- .2 The Contractor shall, at the Contractor's expense, take special precautions to prevent fire occurring in or about the Works, and shall observe and comply with all laws and regulations in force respecting fires, and comply with any special instructions given by the Owner's Representative with respect to the prevention and extinguishing of fires, and will pay all wages and disbursements occasioned by reason of the observance or compliance with such laws, regulations and instructions.
- .3 The Contractor shall protect the Works from all damage from the elements and all other effects in such a manner as the Owner's Representative may direct. The Contractor, however, shall not be relieved of the responsibility for any injury or damage through the Contractor failing to protect the Works, even though the Owner's Representative did not specifically request such protection be provided.
- .4 The Contractor shall at all times keep the Site free from accumulation of waste material and rubbish. On the completion of the Works, the Contractor shall 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 and in a condition satisfactory to the. The Contractor shall be responsible for sweeping and removing all foreign matter from the Site or trucking routes that have had material deposited from the Works.



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**1.54 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 Substantial Performance. Owner-supplied equipment and equipment moved/reinstalled from existing locations shall not be included in the operations guarantee. 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 due notice of trouble.
  - .2 If the Contractor, on being notified, does not for any reason commence repairs within twenty-four (24) hours, the Owner shall have the right to have repairs made by others as necessary to restore or continue service. The cost of such repairs by others shall be borne by the Contractor. The Owner shall at all times inform or attempt to inform the Contractor before hiring others to effect any repairs. It shall, at all times, be 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 the Contractor of the performance and fulfilment of any or all covenants, undertakings, obligations, or duties under the Contract.
  - .4 After the acceptance by the Owner's Representative and during the guarantee period, the burden of maintenance shall fall upon the Owner. 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 Owner.
  - .5 If the Contractor arranges that the manufacturer of some component, or some other party approved by the Owner's Representative, provide the guarantee as his agent under the Contract, then 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 wise affect the Contractor's obligations and liabilities hereunder or relieve the Contractor from the performance and fulfilment of any or all of his covenants, undertakings, or duties under this Contract.

**1.55 SUPPLY OF MATERIALS**

- .1 All materials necessary for the proper completion of the Work shall be supplied by the Contractor.

- .2 Rejected material shall be expeditiously removed from the Work Site after notification from the Owner's Representative. Where the Contractor fails to comply with such notice, the Owner's Representative may require that the rejected material be removed and disposed of outside the Work Site and the Contractor shall pay the costs of removal and disposal of the rejected materials.
- .3 Where the Specifications require the Contractor to supply a specified material/product, the Unit/Lump Sum Price shall be based upon the supply of the material/product so specified, which shall be regarded as the standard of quality required by the Item. After the award of the Contract, the Contractor may apply, in writing, to the Owner's Representative to substitute another material/product other than the material/product specified in the Contract Documents.
  - .1 The submission shall be complete including all technical data and case history applications for the proposed material/product.
  - .2 The Owner's Representative may decide not to entertain substitution during the period of the Contract.
- .4 Substitution of material(s)/product(s) shall not be made without the prior written approval of the Owner's Representative. No proposed substitution(s) will be approved prior to the award of the Contract.

**1.56 PAYMENT ADJUSTMENT FOR FUEL COSTS**

- .1 Due to significant fluctuations in fuel prices this year, this contract will have additional fuel adjustments applied as outlined in Schedule A. This adjustment will only be applied to this specific contract in the 2024 construction season and will not be applied to any contracts in future years.
- .2 This payment adjustment for the change in the price of fuel during the Work is not considered to be extra work.

**Part 2 - NOT USED**

- .1 Not Used.

**Part 3 - Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **SCHEDULE A – PAYMENT ADJUSTMENT FOR FUEL COST**

Compensation payable to the City or the Contractor shall be based on the difference in the IRAC posted wholesale price of diesel 24 hours prior to tender closing of the Contract (Tender Fuel Price) and the IRAC posted wholesale price when the work was completed for the applicable item. This shall be calculated in accordance with the following:

The City shall adjust payments to the Contractor under the applicable Item in the Contract Document based on the Island Regulatory and Appeals Commission (IRAC) historical Petroleum prices for Wholesale Diesel. The price is available on the IRAC website: <https://irac.pe.ca/petrol/current-petroleum-prices/>

The payment adjustment will be established for each IRAC approved adjustment during the time that Work is performed on any of the items in Table 1 and when the Wholesale Price (WP) differed from the Tender Fuel Price (TFP) by more than 5%.

The adjustments will be calculated using the Nominal Fuel Consumption Rates (NFCR) in Table 1 and the formulae shown below. The City shall submit a statement to the Contractor identifying, by Item, the Fuel Adjustment (FA), the associated NFCA, and the Material Quantity (MQ) as identified on the previous Progress Estimate.

**Table 1**  
**Nominal Fuel Consumption Rates (NFCRs) by Item**

Description	NFCR
Common Excavation	1.0 L/m <sup>3</sup>
Borrow	0.5 L/t or 1.0 L/m <sup>3</sup>
Aggregate Base/Subbase	0.6 L/t
Asphalt Base/Seal	5.0 L/t

The payment adjustment shall be calculated as follows, where:

FA = Fuel Adjustment

WP = Wholesale Price

TFP = Tender Fuel Price (posted price 24 hrs prior to tender closing)

NFCR = Nominal Fuel Consumption Rate

MQ = Material Quantity

When  $WP > 1.05 \text{ TFP}$ , the FA is an additional payment to the Contractor as follows:

$$FA = (WP - 1.05TFP) \times NFCR \times MQ$$

When  $WP < 0.95 \text{ TFP}$ , the FA is a deduction from payments due to the Contractor as follows:

$$FA = (WP - 0.95TFP) \times NFCR \times MQ$$

## Examples:

1. A Contractor completes placement of 10,000 tonnes of select borrow and 5,000 tonnes of granular A. During the work period, IRAC approved four adjustments to the Wholesale diesel price which are as follows: \$1.11/L, \$1.15/L, \$1.23/L & \$1.26/L. The price of wholesale diesel 24 hours prior to the tender closing was \$0.90/L.

Within the first fuel adjustment IE. when the diesel price was \$1.11/L, 8,000 tonnes of borrow was placed and no granular was placed.

Within the second fuel adjustment IE. when the diesel price was \$1.15/L, 2,000 tonnes of borrow was placed and 1,500 tonnes of granular was placed.

Within the third adjustment IE. when the diesel price was \$1.23/L, 2,000 tonnes of granular was placed.

Within the final adjustment IE. when the diesel price was \$1.26/L, 1,500 tonnes of granular was placed.

## Calculation

FA = Fuel Adjustment

NFCR = Nominal Fuel Consumption Rate, = 0.5l/t for borrow, = 0.6l/t for granular

MQ = Material Quantity

	Borrow	Granular
Work @ \$1.11 =	8,000t	0
Work @ \$1.15 =	2,000t	1,500t
Work @ \$1.23 =	0	2,000t
Work @ \$1.26 =	0	1,500t

TFP = Tender Fuel Price = \$0.90/L

WP is greater than 1.05\*TFP therefore FA = (WP – 1.05TFP) x NFCR x MQ

		WP	(WP – 1.05TFP) (\$/l)	NFCR (l/t)	MQ (t)	Payment (\$)
<b>Work @ \$1.11</b>	Borrow	\$1.11	\$0.17	0.5	8000	\$680.00
	Granular	\$1.11	\$0.17	0.6	0	\$0.00
<b>Work @ \$1.15</b>	Borrow	\$1.15	\$0.21	0.5	2000	\$210.00
	Granular	\$1.15	\$0.21	0.6	1500	\$189.00
<b>Work @ \$1.23</b>	Borrow	\$1.23	\$0.29	0.5	0	\$0.00
	Granular	\$1.23	\$0.29	0.6	2000	\$348.00
<b>Work @ \$1.26</b>	Borrow	\$1.26	\$0.32	0.5	0	\$0.00
	Granular	\$1.26	\$0.32	0.6	1500	\$288.00

**\$1,715.00** Payment

2. A Contractor completes placement of 4,500 tonnes of asphalt. During the work period, IRAC approved four adjustments to the Wholesale diesel price which are as follows: \$0.80/L, \$0.82/L, \$0.88/L & \$0.80/L. The price of wholesale diesel 24 hours prior to tender closing was \$1.35/L.

Within the first adjustment IE. when the diesel price was \$0.80/L, 1,200 tonnes of asphalt was placed.

Within the second fuel adjustment IE. when the diesel price was \$0.82/L, 1,000 tonnes of asphalt was placed

Within the third fuel adjustment IE. when the diesel price was \$0.88/L, 900 tonnes of asphalt was placed.

Within the final fuel adjustment IE. when the diesel price was \$0.80/L, 1,400 tonnes of asphalt was placed.

### Calculation

FA = Fuel Adjustment

NFCR = Nominal Fuel Consumption Rate = 5 l/t for seal

MQ = Material Quantity

Work @ \$0.80 = 1,200t

Work @ \$0.82 = 1,000t

Work @ \$0.88 = 900t

Work @ \$0.80 = 1,400t

TFP = Tender Fuel Price = \$1.35/L

WP is less than  $0.95 \times \text{TFP}$  therefore  $\text{FA} = (\text{WP} - 0.95 \times \text{TFP}) \times \text{NFCR} \times \text{MQ}$

	WP	$(\text{WP} - 0.95 \times \text{TFP}) (\$/\text{l})$	NFCR (l/t)	MQ (t)	Payment (\$)
Work @ \$0.80	\$0.80	-\$0.48	5	1200	-\$2,880.00
Work @ \$0.82	\$0.82	-\$0.46	5	1000	-\$2,300.00
Work @ \$0.88	\$0.88	-\$0.40	5	900	-\$1,800.00
Work @ \$0.80	\$0.80	-\$0.48	5	1400	-\$3,360.00

**-\$10,340.00 Deduction**

## **Part 1 - General**

### **1.1 CONTINGENCY ALLOWANCE**

- .1 The cash allowance shall be utilized for unforeseen items that may arise during construction, or other items that the Owner may require included in the work.
- .2 The contingency allowance shall not be used for items for which an established unit rate has been given during tendering.
  - .1 An amount of seventy-five thousand dollars (\$75,000) shall be allocated to this Item and has been shown as a separate item within the schedule of unit prices.
  - .2 An allowance in the amount of fifty thousand dollars (\$50,000) has been allocated for utility labour from the Charlottetown Water and Sewer Corporation (CWSC). Actual costs will be compensated, no mark-up will be allowed.
  - .3 An allowance in the amount of thirty-five thousand dollars (\$35,000) has been allocated for tree protection (provisional). Actual costs will be compensated, no mark-up will be allowed.
    - .1 This allowance will only be used for tree protection, above and beyond the terms and conditions outlined in the specifications, as directed specifically by the Owner's Representative.
- .3 Funds will be drawn from the Cash Allowance only by Change Order.
- .4 At closeout of Contract, funds remaining in Cash Allowance will be credited to Owner by Change Order.

## **Part 2 - Execution**

### **2.1 EXECUTION**

- .1 The Contractor shall be allowed a fifteen percent (15%) mark-up for overhead and profit above actual costs under this Item.
- .2 For work performed by sub-contractors, the General Contractor shall be allowed five percent (5%) mark-up for overhead and profit above approved sub-contractors invoices.
- .3 No amount of the cash allowance is to be released unless accomplished by a detailed Change Order signed by the Owner's Representative and/or the Owner.

**END OF SECTION**

## Part 1 - General

### 1.1 MEASUREMENT

- .1 The method of measurement shall be as stated hereinafter for the individual items.
- .2 Provisional items are included in the Contract to establish a unit rate and an amount to do particular work. Include unit price and amount as tendered in Tender Price. The Owner reserves the right to delete all or portions of this item from the total Contract Price.

### 1.2 PAY ITEMS

- .1 Precast Structures:
  - .1 Unit of Measurement: EACH (ea).
  - .2 Method of Measurement: number of installed structures of the specified type.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavating, dewatering, bypass pumping, sheeting and shoring, disposal of surplus materials, supply and placement of bedding and backfill, compaction, supply and installation of precast concrete sections, frames and grates or covers as specified, rigid insulation, water proofing, testing of sanitary manholes and final elevation adjustments such that precast structures are fully complete and operational in all respects, all as shown on the Drawings and as specified. The price shall also include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
  - .4 Work also includes:
    - .1 Removal and off-site disposal (regardless of type, diameter and depth) of existing catchbasins, laterals, manholes, frames and covers, sanitary sewer and storm sewer as directed by the Owner's Representative.
    - .2 Temporary removal, restraint, replacement and/or accommodation during construction of any above ground or below ground utilities, pipelines or other infrastructure to enable the installation of any precast structures.
    - .3 As directed in the field by the Owner's Representative, adjustment to finished grade of existing manholes, catchbasins or sluice boxes that are designated to remain in place.
- .2 Replace Existing Sanitary Manhole Sections and Reuse Existing Frame and Cover:
  - .1 Unit of Measurement: LUMP SUM (LS).
  - .2 Method of Measurement: N/A

- .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavating, dewatering, sheeting and shoring, disposal of surplus materials, supply and installation of the new precast concrete manhole section(s), supply and placement of backfill, compaction, reuse of existing frame and cover, water proofing and final elevation adjustments such that the existing precast structure is fully complete and operational in all respects, all as shown on the Drawings and as specified. The price shall also include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
- .4 Work also includes:
  - .1 Removal and off-site disposal (regardless of type, diameter and depth) of existing surplus precast concrete manhole sections as directed by the Owner's Representative.
  - .2 Temporary removal, restraint, replacement and/or accommodation during construction of any above ground or below ground utilities, pipelines or other infrastructure to enable the replacement of any precast sections.
- .3 Supply and Install Storm Sewer:
  - .1 Unit of Measurement: METRE (m).
  - .2 Method of Measurement: from the centres of structures measured horizontally.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, storm sewer by-pass management (i.e. gravity or pumping), sheeting, shoring, disposal of surplus materials, bedding and backfill, compaction, supply and installation of pipe, all connections, core drilling into existing or new storm manholes, catch basins or storm sewers, end caps, elbows, couplings, testing and CCTV inspection, all as shown on the Drawings and as specified, such that the storm sewer is fully complete and operational in all respects. The price shall also include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
  - .4 Work also includes:
    - .1 Connections to existing storm sewer pipe, storm sewer laterals, manholes or catch basins as required.
    - .2 Daylighting of existing infrastructure prior to construction to identify any potential conflicts with existing infrastructure prior to the storm sewer installation.
    - .3 Removal and off-site disposal of existing storm sewer.
    - .4 Temporary removal, restraint, replacement and/or accommodation during construction of any above ground or below ground utilities, pipelines or other infrastructure to enable the installation of any storm sewer piping or related services.



- .5 Abandonment in place of existing storm sewer (regardless of diameter or type) as indicated on the Drawings or as directed by the Owner's Representative. Work shall include all excavation, supply and installation of storm sewer end caps, supply and placement of flowable fill, backfilling, compaction, restorations and all incidentals.
  - .6 Base asphalt reinstatement to the existing road elevation of the trenches on North River Road or Atlantic Road within 24 hours of the trench backfilling such that traffic does not have to drive across a gravel trench while construction continues on Seaview Boulevard.
- .4 Supply and Install Sanitary Sewer:
- .1 Unit of Measurement: METRE (m).
  - .2 Method of Measurement: from the centres of structures measured horizontally.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, sanitary sewer by-pass management (i.e. gravity or pumping), sheeting, shoring, disposal of surplus materials, bedding and backfill, compaction, supply and installation of pipe, connections, core drilling into existing sanitary manholes, end caps, elbows, couplings, testing and CCTV inspection, all as shown on the Drawings and as specified, such that the sanitary sewer is fully complete and operational in all respects.. The price shall also include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
  - .4 Work also includes:
    - .1 Connections to existing sanitary sewer pipe, sanitary sewer laterals or manholes as required.
    - .2 Daylighting of existing infrastructure prior to construction to identify any potential conflicts with existing infrastructure prior to the sanitary sewer installation.
    - .3 Removal and off-site disposal of existing sanitary sewer.
    - .4 Temporary removal, restraint, replacement and/or accommodation during construction of any above ground or below ground utilities, pipelines or other infrastructure to enable the installation of any storm sewer piping or related services.
    - .5 Abandonment in place of existing sanitary sewer (regardless of diameter or type) as indicated on the Drawings or as directed by the Owner's Representative. Work shall include all excavation, supply and installation of sanitary sewer end caps, supply and placement of flowable fill, backfilling, compaction, restorations and all incidentals.
    - .6 Base asphalt reinstatement to the existing road elevation of the trenches on North River Road or Atlantic Road within 24 hours of the trench backfilling such that traffic does not have to drive

across a gravel trench while construction continues on Seaview Boulevard.

- .5 Supply and Install Sanitary Service Laterals:
  - .1 Unit of Measurement: METRE (m).
  - .2 Method of Measurement: measurement of sanitary service laterals shall be in linear metres measured from the center of the sewer main to the capped end of the service lateral or to the connection to the existing sanitary service lateral.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, sanitary sewer by-pass management (i.e. gravity or pumping), removal and disposal of existing sanitary service laterals and appurtenances, supply and installation of the sanitary service lateral pipe of the appropriate size, saddles, bends, connections, rigid insulation and removal and disposal of excess trench materials, all as shown on the Drawings and as specified. Work also includes the supply, placement and compaction of bedding and backfill materials. The price shall also include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
- .6 Supply and Install Watermain:
  - .1 Unit of Measurement: METRE (m).
  - .2 Method of Measurement: along length of main in place, including the distance through valves and fittings.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, removal and disposal of existing watermain, supply and installation of the watermain pipe of the appropriate size, connections, couplings, rigid insulation, thrust blocks, joint restraint systems, cathodic protection, testing, flushing, disinfection and removal and disposal of excess trench materials, all as shown on the Drawings and as specified.
  - .4 Work also includes:
    - .1 The supply, placement and compaction of bedding and backfill materials.
    - .2 Zinc anodes, protective coating and protective sheeting will be considered incidental to the work required. No measurement for payment will be allowed.
    - .3 Payment for the supply, installation and removal of temporary testing and disinfection points of required size, as shown on the Drawings, to facilitate the testing and disinfection procedures, will not be measured for payment and shall be considered as incidental to the work required.
    - .4 Removal and off-site disposal of existing watermain to the limits and at the locations indicated on the Drawings or directed in the field by the Owner's Representative.

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- .5 Supply and installation of proper watermain end caps and thrust blocks on sections of pipe indicated on the drawings for abandonment.
  - .6 Abandonment in place of existing watermain (regardless of diameter or type) as indicated on the Drawings or as directed by the Owner's Representative. Work shall include all excavation, supply and installation of watermain end caps, supply and placement of flowable fill, backfilling, compaction, restorations and all incidentals.
  - .7 Temporary removal, restraint, replacement and/or accommodation during construction of any above ground or below ground utilities, pipelines or other infrastructure to enable the installation of any watermain or related services.
  - .8 The price shall include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
  - .9 Base asphalt reinstatement to the existing road elevation of the trenches on North River Road or Atlantic Road within 24 hours of the trench backfilling such that traffic does not have to drive across a gravel trench while construction continues on Seaview Boulevard.
- .7 Supply and Install Watermain Fittings:
- .1 Unit of Measurement: EACH (ea).
  - .2 Method of Measurement: number of tees, bends, reducers, crosses and couplers installed of the appropriate size.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, supply and installation of the fittings of the appropriate size, thrust blocks, mechanical joint restraint systems, cathodic protection, flushing/sampling ports, drains, taps, testing, flushing, disinfection and removal and disposal of excess trench materials, all as shown on the Drawings and as specified.
  - .4 Work also includes:
    - .1 The supply, placement and compaction of bedding and backfill materials.
    - .2 Zinc anodes, protective coating and protective sheeting will be considered incidental to the work required. No measurement for payment will be allowed.
    - .3 The price shall include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
- .8 Supply and Install Watermain Valves:
- .1 Unit of Measurement: EACH (ea).
  - .2 Method of Measurement: number of gate valves or tapping sleeves and valves installed of the appropriate size.

- .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, supply and installation of the gate valve, tapping sleeve and valve, valve box unit, thrust blocks, joint restraint systems, cathodic protection, flushing/sampling ports, drains, taps, testing, flushing, disinfection, removal and disposal of excess trench material and adjustment of valve box to finished grade, all as shown on the Drawings and as specified.
- .4 Work also includes:
  - .1 The supply, placement and compaction of bedding and backfill materials.
  - .2 Zinc anodes, protective coating and protective sheeting will be considered incidental to the work required. No measurement for payment will be allowed.
  - .3 The price shall include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
  - .4 As directed in the field by the Owner's Representative, adjustment to finished grade of existing valve boxes or valve chambers that are designated to remain in place.
- .9 Supply and Install Fire Hydrant:
  - .1 Unit of Measurement: EACH (ea).
  - .2 Method of Measurement: number of complete installed fire hydrants.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, removal and disposal of existing fire hydrant and associated components, supply and installation of the hydrant and fittings, tee, lead watermain pipe, valve, valve box, thrust blocks, anchors, joint restraint systems, hydrant extensions, cathodic protection, testing, flushing, disinfection, repainting of hydrant to City Standards, adjustment of valve box to finished elevation and removal and disposal of excess trench materials, all as shown on the Drawings and as specified.
  - .4 Work also includes:
    - .1 The supply, placement and compaction of bedding and backfill materials.
    - .2 The salvage of all existing fire hydrants and their delivery to the City's Public Works Garage on MacAleer Drive.
    - .3 Zinc anodes, protective coating and protective sheeting will be considered incidental to the work required. No measurement for payment will be allowed.
    - .4 The price shall include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
- .10 Supply and Install Water Service Laterals:
  - .1 Water Service Lateral:
    - .1 Unit of Measurement: METRE (m).

- .2 Method of Measurement: along length of water service lateral in place, from the center of the watermain to the end including the distance through the "goose neck".
- .2 Water Service Appurtenance:
  - .1 Unit of Measurement: EACH (EA).
  - .2 Method of Measurement: number of water service appurtenances installed of the appropriate size.
- .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, dewatering, removal and disposal of existing water service laterals and appurtenances, supply and installation of the water service lateral pipe of the appropriate size, tapping and connecting to the main, supply and installation of main stop, service saddle, piping or tubing, corporation couplings, curb stop and box, rigid insulation, cathodic protection, testing, flushing, disinfection and removal and disposal of excess trench materials, all as shown on the Drawings and as specified.
- .4 Work also includes:
  - .1 The supply, placement and compaction of bedding and backfill materials.
  - .2 Zinc anodes, protective coating and protective sheeting will be considered incidental to the work required. No measurement for payment will be allowed.
  - .3 The price shall include collection of all record information including inverts, co-ordinates (NAD83) and as-built swing ties.
- .11 Common Excavation:
  - .1 Unit of Measurement: CUBIC METRE (m<sup>3</sup>).
  - .2 Method of Measurement: measured in cubic metres calculated from cross sections taken in areas of excavation.
  - .3 This Item includes: all labour, equipment, materials and incidentals involved to provide layout, traffic control, excavation, ditching, sheeting, shoring, dewatering, loading, hauling, placement, compaction, fine grading stockpiling, off-site disposal of surplus materials, disposal of existing asphalt surfaces at approved facilities, reinstatement of all roadway signs and posts and reinstatement of all existing pavement markings and symbols, all as shown on the Drawings and as specified.
  - .4 No measurement and payment will be made for:
    - .1 Saw cutting, removal and disposal of existing asphalt surfaces.
    - .2 Cold milling of existing asphalt edges for construction of stepped keyway for asphalt slug.
    - .3 Removal and disposal of existing concrete sidewalk or curb, regardless of type.
    - .4 Removal and disposal of existing trees, shrubs and plantings.
    - .5 Protection of existing trees, shrubs, plantings and flower beds.

- .6 Removal and disposal of existing driveway culverts.
  - .7 Unnecessary excavations beyond lines established.
  - .8 Removal and correction of soft or unstable material create as a result of contractor activities.
  - .9 Swale construction and site grading.
  - .10 Extra hauling of materials temporarily stockpiled on site.
  - .11 Overhaul.
  - .12 Compaction and proof rolling of embankment areas.
  - .13 Off-site disposal of removed material.
  - .14 Any associated disposal or recycling fees.
- .12 Geogrid (Provisional):
- .1 Unit of Measurement: SQUARE METRE (m<sup>2</sup>).
  - .2 Method of Measurement: number of square metres of area covered with geogrid.
    - .1 Overlapped joints, patches and seams shall be measured as a single layer of geogrid.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, layout, supply and placement of geogrid along roadways and areas as directed by the Owner's Representative.
- .13 Select Borrow:
- .1 Unit of Measurement: TONNE (t).
  - .2 Method of Measurement: measured in tonnes as taken from weight slips supplied and placed.
  - .3 This Item includes: all labour, equipment and materials involved to provide traffic control, supply, handling, loading, hauling, placing, fine grading, compacting and proof rolling of the select borrow materials, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Owner's Representative.
  - .4 There shall be no payment for extra thickness or width of select borrow materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Owner's Representative there is extra thickness or width, the appropriate weight will be deducted.
- .14 Class 'A' Granular:
- .1 Unit of Measurement: TONNE (t).
  - .2 Method of Measurement: measured in tonnes as taken from weight slips supplied and placed.
  - .3 This Item includes: all labour, equipment and materials involved to provide traffic control, supply, handling, loading, hauling, placing, fine grading, compacting and proof rolling of the class 'A' granular materials, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Owner's Representative.

- .4 There shall be no payment for extra thickness or width of class 'A' granular materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Owner's Representative there is extra thickness or width, the appropriate weight will be deducted.
- .15 Concrete Curb:
  - .1 Unit of Measurement: METRE (m).
  - .2 Method of Measurement: number of lineal metres of specified type acceptably completed.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, layout, supply and placement of concrete to form curbs of the type specified, including slip-form curb machine, fabrication of new molds as required, forming, formwork, dowels, finishing, curing, concrete testing, matching to existing concrete curb, supply, placement and compaction of Class A granular base, isolation and control joints and backfilling, all as shown on the Drawings and as specified.
- .16 Concrete Sidewalk:
  - .1 Unit of Measurement: SQUARE METRE (m<sup>2</sup>).
  - .2 Method of Measurement: number of square metres of concrete sidewalk or integral concrete curb/sidewalk of specified type acceptably completed.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, layout, supply and placement of all materials to form and construct concrete sidewalk or integral concrete curb/sidewalk of the type specified, including supply, placement and compaction of Class A granular base, fabrication of new molds as required, forming, formwork, dowels, doweling into existing, welded wire fabric for non-residential driveways, finishing, curing, protection, concrete testing, isolation and control joints and backfilling, all as shown on the Drawings and as specified.
  - .4 There shall be no additional payment for increased concrete thickness in driveway areas.
  - .5 Restoration or installation of concrete walkways to residential homes shall be paid under this Item.
- .17 Asphalt:
  - .1 Unit of Measurement: TONNE (t).
  - .2 Method of Measurement: measured in tonnes as taken from weight slips supplied and placed.
  - .3 This Item includes: all labour, equipment and materials involved to provide traffic control, supply, handling, loading, hauling, placing and compacting of the specified class of asphalt material, as well as any incidentals, to the limits and at the locations indicated on the Drawings or directed in the field by the Owner's Representative. Item also includes the supply and application of tack coat between the base course and seal course, as well as on longitudinal joints, keyways and curb edges.

- .4 No measurement and payment will be made for:
  - .1 Saw cutting, removal and disposal of existing asphalt surfaces.
  - .2 Cold milling of existing asphalt edges for construction of stepped keyway for asphalt slug.
  - .3 The supply and installation of temporary pavement markings.
- .18 Tactile Warning Surface Indicators:
  - .1 Unit of Measurement: EACH (ea).
  - .2 Method of Measurement: number of tactile warning surface indicators acceptably installed.
  - .3 This Item includes all labour, equipment, materials and incidentals, including traffic control and layout, supply and placement of the tactile warning surface indicators, at the locations indicated on the Drawings or directed in the field by the Owner's Representative.
- .19 Topsoil and Sod:
  - .1 Unit of Measurement: SQUARE METRE (m<sup>2</sup>).
  - .2 Method of Measurement: square metres of topsoil and sod acceptably placed.
  - .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control for the supply, handling, placement and maintenance of topsoil to the specified thickness complete with sod, all as shown on the Drawings and as specified.
  - .4 No measurement or payment will be made for:
    - .1 Preparation of subgrade for placing of topsoil.
    - .2 Disposal of any materials off site will be considered incidental to the Work.
    - .3 Raking, watering, fertilizing and all maintenance items that may be required due to poorly established growth at provisional acceptance.
    - .4 Mowing and fertilizing and maintenance of all areas up until the date of provisional acceptance.
- .20 Unit Paver Driveway Restoration:
  - .1 Unit of Measurement: SQUARE METRE (m<sup>2</sup>).
  - .2 Method of Measurement: square metres of unit paver driveway acceptably placed or acceptably removed and reinstalled as identified by the Owner's Representative.



- .3 This Item includes: all labour, equipment, materials and incidentals, including traffic control, excavation, grading, supply and placement of 300mm thickness of class 'A' granular materials underneath the unit pavers, all sand bedding and sand for interlocking unit pavers, compaction, temporary removal and reinstallation of existing unit pavers as directed by Owner's Representative to achieve new driveway grades, protection of existing unit pavers and the supply and installation of new unit pavers that match dimensions, colour and pattern of existing, all to provide a complete and finished driveway.
- .4 No measurement or payment will be made for:
  - .1 Unnecessary excavations beyond lines established.
  - .2 Removal and correction of soft or unstable material created as a result of contractor activities.
  - .3 Off-site disposal of removed material.

**Part 2 - NOT USED**

- .1 Not Used.

**Part 3 - Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION**

- .1 This section specifies requirements and procedures for Contractor's submissions of shop drawings, product data, samples and mock-ups to Owner's Representative for review.

### **1.2 GENERAL REQUIREMENTS**

- .1 Submit to Owner's Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Owner's Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present shop drawings and product data in SI units. Where items or information is not produced in SI units, converted values may be acceptable.
- .5 Review submittals prior to submission to Owner's Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Verify field measurements and affected adjacent Work are co-ordinated.
- .7 Catalogues, pamphlets or other documents submitted to describe items which review is being requested, shall be specific and identification in catalogue, pamphlet, etc. of item submitted shall be clearly made in ink. Data of general nature will NOT be accepted.
- .8 Shop drawings with engineering content must bear the stamp and signature of the Professional Engineer responsible and who must be licensed or registered in the Province of Prince Edward Island.
- .9 Notify Owner's Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .10 Contractor's responsibility for errors and omissions in submission is not relieved by the Owner's Representative's review of submittals.
- .11 Submit PDF copies of shop drawings and/or product data sheets and/or brochures for each requirement requested in specification Sections and as the Owner's Representative may reasonably request.

- .12 If upon review by the Owner's Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through the same procedure indicated above, shall be performed before fabrication and installation of Work may proceed.
- .13 Keep one reviewed copy of each submission on site.

### 1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
- .2 Allow 5 days from the date of receipt by Owner's Representative's office, for Owner's Representative's review of each submission, unless otherwise indicated in the contract documents or additional time for the Owner's Representative to reasonably review complex shop drawings.
- .3 Adjustments made on shop drawings by Owner's Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Owner's Representative prior to proceeding with Work.

### 1.4 SAMPLES

- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Owner's Representative's business address.
- .3 Notify Owner's Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

## Part 2 - Products

### 2.1 NOT USED

- .1 Not Used.

## Part 3 - Execution

### 3.1 NOT USED

- .1 Not Used.

**END OF SECTION**

## Part 1 - General

### 1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .3 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .4 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands" and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.
- .5 Watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.
- .6 Alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.
- .7 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.
- .8 Asbestos: The fibrous form of crocidolite, amosite, chrysotile, anthophyllite, actinolite, tremolite, or a mixture containing any of those minerals.
- .9 Asbestos Containing Materials: Vermiculite determined to contain any asbestos when tested according to an approved method; or any material, other than vermiculite, that when tested according to an approved method is determined to contain a proportion of asbestos greater than 0.5% if the material is friable, or a proportion of asbestos greater than 1.0% if the material is non-friable.
- .10 Asbestos Waste: Material that is discarded because there is a reasonable chance that asbestos might be released from it and become airborne, including protective clothing that is contaminated with asbestos.
- .11 Friable: Material that, when dry, is or can be crumbled, pulverized or powdered by hand pressure.

## 1.2 TRANSPORTATION

- .1 Transport hazardous materials and hazardous waste in compliance with Federal Transportation of Dangerous Goods Act.
- .2 Do not overload trucks when hauling material. Secure contents against spillage.
- .3 Maintain trucks clean and free of mud, dirt and other foreign matter.
- .4 Avoid potential release of contents and of any foreign matter onto highways, roads and access routes used for the Work. Take extra care when hauling dredged material and other hazardous materials. Immediately clean any spillage and soils.

## 1.3 FIRES

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

## 1.4 HAZARDOUS MATERIAL HANDLING WHMIS

- .1 Handle and store hazardous materials on site in accordance with procedures and requirements.
- .2 Store all hazardous liquids in location and manner to prevent their spillage into the environment.
- .3 Maintain written inventory of all hazardous materials kept on site. List product name, quantity and storage date.
- .4 Keep MSDS data sheets on site for all items.

## 1.5 PEROLEUM, OIL AND LUBRICANTS

- .1 Comply with Federal and Provincial laws, regulations, codes and guidelines for the storage of fuel and petroleum products on site.
- .2 No fuel or petroleum products shall be stored on site. Do not fuel or lubricate equipment within 30 metre buffer zones. Obtain approval from Owner's Representative of acceptable location on site for fuel storage and equipment service.
- .3 Do not dump petroleum products or any other deleterious substances on ground or in the water.
- .4 Be diligent and take all necessary precautions to avoid spills and contaminate the soil and water (both surface and subsurface) when handling petroleum products on site and during fueling and servicing of vehicles and equipment.
- .5 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre overpack spill kit for containment and cleanup of spills.
- .6 Maintain vehicles and equipment in good working order to prevent leaks on site.
- .7 In the event of a petroleum spill, immediately notify the Owner's Representative and the PEI Department of Environment, Energy and Climate Action. Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

**1.6 DISPOSAL OF WASTES**

- .1 Do not bury rubbish, demolition debris and waste materials on site.
- .2 Dispose and recycle demolition debris and waste materials.
- .3 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners, etc.) and petroleum products into waterways, storm or sanitary sewers or in waste landfill sites.
- .4 Dispose of hazardous waste in accordance with applicable Federal and Provincial laws, regulations, codes and guidelines.
- .5 Any construction, contaminated soil or demolition debris will be disposed of in a Provincially approved manner (either a permit or receipts for tippage must be submitted to the Owner's Representative to verify that the material was disposed of in a provincially approved manner).

**1.7 REMOVAL AND DISPOSAL OF ASBESTOS CEMENT WATERMAIN**

- .1 The removal and disposal of asbestos cement watermain shall be in accordance with applicable Federal and Provincial laws, regulations, codes and guidelines.
  - .1 All costs are deemed to be included in the Contract unit price quoted in the tender submission.
- .2 The Contractor shall be responsible to develop an Asbestos Management Plan in accordance with Provincial requirements. A copy of the Asbestos Management Plan shall be provided to the Owner's Representative prior to the start of construction.
- .3 In Prince Edward Island, any time asbestos-containing material (ACM) is disturbed (including repairs, renovations, removal or demolition) the work must be completed by an asbestos contractor with a valid asbestos contractor's certificate. A copy of the certificate shall be provided to the Owner's Representative prior to the start of construction.
- .4 All excavated asbestos cement watermain and related materials shall become property of the Contractor and shall be disposed of in a Provincially approved manner (documentation of disposal at the facility shall be provided to the Owner's Representative).
  - .1 All asbestos waste must be delivered to the East Prince Waste Management Facility (EPWMF). It is the only designated industrial landfill site for hazardous waste in the Province.

**1.8 DRAINAGE**

- .1 Ensure that erosion and sediment control measures are provided on site at all times during construction.

- .2 Work should be scheduled to avoid periods of heavy precipitation. Short-term erosion and sediment control measures (e.g. silt fence, straw bales, temporary matting, geotextile filter fabric) must be installed to prevent runoff from entering any adjacent waterway. These structures will remain in place until natural vegetation has been established.
- .3 Provide temporary drainage and pumping as required to keep excavations on site free of standing water.
  - .1 Control disposal or runoff of water containing suspended materials or other harmful substances in in compliance with the requirements of authorities having jurisdiction.

#### 1.9 **SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties in accordance with the Canadian Landscape Standard - First Edition, Section 03 - Site Preparation and Protection of Existing Site Elements.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes. Ensure that control measures used for protection are in compliance with Municipal laws and regulations.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation. All work is to be confined to the site limits delineated and/or directed by the Owner's Representative.
- .5 Any exposed soil area must be minimized by limiting the area that is exposed at one time and by limiting the time that any one area is exposed. All stockpiled material must be covered and/or dyked to prevent erosion or silty runoff from leaving the site. Exposed soil should be replanted or sodded to ensure soil stabilization.
- .6 Restore disturbed areas as close as possible to natural conditions. Backfill excavate, grade and contour soil, replace topsoil, fertilize and reseed with approved seed mixture.

#### 1.10 **WORK ADJACENT TO WATERWAYS**

- .1 Construction equipment to be operated on land only.
- .2 Keep waterways free of excavated fill, waste material and debris.
- .3 Design and construct temporary crossings to minimize waterways erosion.
- .4 Do not skid logs or construction materials across waterways.

#### 1.11 **HISTORICAL/ARCHAEOLOGICAL CONTROL**

- .1 If materials of potential historical or cultural interest are encountered, Work will cease at that location and the Owner's Representative will be notified.

#### 1.12 WATER QUALITY

- .1 Maintenance of equipment must be carried out on a regular basis.
- .2 The construction material must be clean and non-toxic (free of fuel, oil, grease, and/or any contaminants).
- .3 Remove any accidental release of concrete on site prior to solidification.
- .4 Ensure concrete trucks are clean and will not release any material during transport to the site.
- .5 Do not discharge residual or rejected concrete on site. Do not wash and clean concrete vehicles on site. Carryout all dumping and cleaning operations at the concrete plant according to all Provincially approved practices/regulations.
- .6 Follow any sediment and erosion control plan and emergency response plan provided by the Owner's Representative.

#### 1.13 BIRD AND BIRD HABITAT

- .1 Abide by the Migratory Birds Convention Act (MBCA) in regards to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.
- .2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.
- .3 During nighttime work, position flood lights in opposite direction of nearby bird nesting habitat.
- .4 Do not use natural previously undisturbed areas of the site to conduct work.
- .5 Ensure that food scraps and garbage are not left at the work site.

#### 1.14 AIR QUALITY

- .1 Keep airborne dust and dirt resulting from the Work on site to an absolute minimum.
- .2 Apply dust control measures to roads, parking lots and work areas.
- .3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the Work.
- .4 Do not use oil or any other petroleum products for dust control.
- .5 All construction equipment must be fitted with standard and well-maintained noise suppression devices. Construction activities must respect appropriate time restriction and use smaller, less disturbing equipment where possible.

#### 1.15 ANCILLARY FACILITIES

- .1 The Contractor shall not utilize lands outside of the right-of-way (ROW) for construction activities without permission of the Owner.



## **Part 2 - Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 - Execution**

### **3.1 CLEANING**

- .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Proceed with final cleaning upon completion and removal of surplus materials, rubbish, tools and equipment.
- .4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures

### **1.2 INSPECTION**

- .1 Allow Owner's Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Owner's Representative or by inspection authorities having jurisdiction.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Owner's Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- .5 Pay costs to uncover and make good work disturbed by inspections and tests.

### **1.3 TESTING**

- .1 The Contractor shall retain a Geotechnical Engineer to carry out the required testing as outlined in the Specifications.
- .2 Tests on materials, as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
  - .1 Provide all necessary instruments, equipment and qualified personnel to perform tests.
- .3 At completion of tests, turn over 2 sets of fully documented tests reports to the Owner's Representative. Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .4 Unspecified tests may also be made by Owner's Representative, at the discretion of the Owner's Representative. The costs of these tests will be paid for by the Owner's Representative.
- .5 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Owner's Representative as required to verify acceptability of corrected work.

#### 1.4 INDEPENDENT INSPECTION AGENCIES

- .1 When specified or directed, submit Owner's Representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .2 Provide labour and facilities to obtain, handle and deliver samples.
- .3 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.

#### 1.5 ACCESS TO WORK

- .1 Facilitate Owner's Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.
- .2 Furnish labour and facility to provide access to the work being inspected and tested.
- .3 Co-operate to facilitate such inspections and tests.

#### 1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been identified by Owner's Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good damages to new construction and finishes resulting from removal or replacement of defective work.

#### 1.7 REPORTS

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

### Part 2 - Products

#### 2.1 NOT USED

- .1 Not Used.

### Part 3 - Execution

#### 3.1 NOT USED

- .1 Not Used.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION**

- .1 This section is to provide traffic control pursuant to Section 6 of the Provincial Roads Act as stipulated in the PEI Temporary Workplace Traffic Control Manual (TWTCM - latest edition).

### **1.2 RELATED REQUIREMENTS**

- .1 Section 01 10 10 – General Instructions
- .2 Section 01 35 28 – Health and Safety Requirements

### **1.3 REFERENCE STANDARDS**

- .1 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.
  - .2 Temporary Workplace Traffic Control Manual.
- .2 Regulate traffic in accordance with the Roads Act (Prince Edward Island) as stipulated in the TWTCM distributed by the PEI Department of Transportation and Infrastructure.
- .3 The Owner's Representative reserves the right to direct the Contractor to reduce either the number or length of traffic control work areas during peak traffic volumes or when cumulative delays exceed the specified maximum.

### **1.4 PROTECTION OF PUBLIC TRAFFIC**

- .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 When working on travelled way:
  - .1 Place equipment in position to minimize interference and hazard to travelling public.
  - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3 Do not leave equipment on travelled way overnight.
- .3 Do not close any lanes of roadway without approval of Owner's Representative. Before re-routing traffic, erect suitable signs and devices in accordance with instructions contained in the TWTCM. Provide sufficient crushed gravel to ensure a smooth riding surface during work.
  - .1 Any such closure requests or re-routing of traffic shall be submitted in writing to the Owner's Representative for review and approval, a minimum of twenty-four hours (24 hr) in advance of said closure.
- .4 Keep travelled way graded, free from potholes and of sufficient width for required number of lanes of traffic.

- .5 Limit construction to maintain at least one lane of traffic in each direction at all times except as noted in the Drawings.
- .6 During periods of non work activity (i.e. evenings, weekends and holidays), the intersection shall be returned to operation with traffic signals, either existing, temporary or new. Due to the high traffic volume, stop and go operations of the intersection will not be permitted during periods of non work activity.
- .7 When directed by Owner's Representative, provide well graded, detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.
- .8 Provide and maintain reasonable road access and egress to properties and businesses fronting along or in vicinity of work under Contract unless approved otherwise by Owner's Representative.
- .9 The Contractor shall provide a certified traffic control manager (TCM), who has successfully completed the Temporary Workplace Traffic Control Training Course, **TO BE ON SITE AT ALL TIMES** when active construction is taking place. The TCM will be responsible to supervise the placement and dismantling of all temporary condition signs and devices that indicate to the road user that highway construction activity exists and to also ensure that proper traffic control procedures are carried out in accordance with the TWTCM. The TCM is considered part of the Contractor's supervision and administration staff and the provision this individual is considered incidental to the Work.
- .10 A traffic control plan must be prepared by the Contractor and approved by the Owner's Representative prior to commencing any work.
  - .1 Prior to commencing any work, the Contractor shall arrange, set up and attend an on-site site meeting with the Fire Department and City of Charlottetown Public Works to review the proposed traffic control plan.
- .11 The Contractor shall advise the Fire Department, Police Department and Island EMS of the construction schedule and any temporary detours on a daily basis.

## 1.5 DETOURS

- .1 Construct and maintain detours through the work zone as may be required, to the approval of the Owner's Representative.

## 1.6 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 All traffic signs are to be bilingual or symbolic and shall be Level 1 reflectivity.
- .3 Supply and erect signs, delineators, barricades and miscellaneous warning devices to TWTCM.
- .4 Place signs and other devices in locations in the TWTCM.

- .5 For every project, the TCM shall perform an Initial Inspection immediately following the setup of all devices to ensure that the Traffic Control Plan has been properly implemented. This initial inspection shall document the following information:
  - .1 The date and time of the inspection.
  - .2 Verification that all Traffic Control Devices are in their proper location, in good condition, and functioning as intended.
  - .3 A description of any changes made to the original Traffic Control Plan, including the reasons for these changes.
  - .4 Any observed driver issues (confusion, excessive speeds, etc.).
  - .5 The signature of the TCM.
- .6 No work activities shall commence until after the initial inspection has been completed and documented. An initial night inspection shall also be undertaken if traffic control is to be left in place during hours of darkness.
- .7 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Any issues noted during routine inspections, such as damaged or displaced signs, shall be corrected immediately.
  - .3 Remove or cover signs which do not apply to conditions existing from day to day.
- .8 Routine inspections of Work Areas are necessary to ensure that all Traffic Control Devices remain in their proper location and continue to function as intended. The frequency of these inspections depend on the project size and duration, the complexity of traffic control, the nature of the work, and the number of problems observed in previous inspections. For Long Duration projects, inspections shall be conducted at the beginning and end of each work day as a minimum. Daily inspections shall also be conducted on holidays, weekends, and other times when the Work Area is not Active. Traffic control that is left in place overnight shall also be inspected during hours of darkness. Work Areas that remain Passive for an extended period (e.g. over the winter months) shall be inspected at least every two weeks.

## 1.7 CONTROL OF PUBLIC TRAFFIC

- .1 Provide Traffic Control Personnel who have a valid provincial license and are trained in accordance with and properly equipped as specified in the TWTCM, for situations as follows:
  - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

- .3 When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .2 When temporary rerouting of traffic is required, the Contractor shall not divert traffic through residential areas for extended periods of time. Local traffic and emergency vehicles must have continuous access to streets in the construction area. It is essential that a lane of sufficient width for passage of Fire Trucks be provided through the construction area.
- .3 All Traffic Control Personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic control zone.
- .4 All construction vehicles shall operate in accordance with and are subject to the traffic control restrictions and operations in place on the project.
- .5 The foreman will be required to carry a portable radio supplied by the City of Charlottetown Fire Department, which will be used solely to notify the Contractor of emergency services responding to a call within the construction area. The intent is to provide notice to the Contractor such that access will be provided for emergency vehicles, if the situation should arise.
- .1 A short radio procedure tutorial will be given if required. However back and forth communication is not expected. The radio is simply a means for the Contractor to be made aware of emergency vehicles enroute to the construction area. The Contractor will be responsible to ensure that the radio is kept charged and set to the proper channel.
- .6 The Contractor must be aware of all scheduled activities and events to occur in Charlottetown during the construction period, and be prepared to accommodate any activity that may involve the project route including increase in traffic flow.

#### 1.8 TRAFFIC CONTROL PLAN REQUIREMENTS

- .1 The Contractor shall determine the appropriate site specific traffic control requirements for the type and sequence of Work under the Contract, taking into consideration all points identified in Section 7.0, TWTCM.
- .2 The required traffic control measures will be included in the construction contract. A detailed construction sequencing and Traffic Control Plan will be required prior to construction. On-going information and communications will be maintained throughout the construction period.
- .3 The Contractor shall provide the Owner's Representative with a Traffic Control Plan (TCP) at least five working days prior to the commencement of construction. The TCP will describe the temporary traffic controls to be used on the site at all times during the various phases of construction.

- .1 The TCP will be prepared as per PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 908.
- .2 The TCP shall be a drawing and/or map that addresses the following items as a minimum:
  - .1 Required devices, including placement, location, spacings and dimensions (TWTCM typical layout).
  - .2 Traffic Control Persons (where needed).
  - .3 Public advisory notices (where applicable).

## **Part 2 - Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 - Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



## **Part 1 - General**

### **1.1 DESCRIPTION**

- .1 Administrative procedures preceding inspection and acceptance of Work by Owner's Representative.

### **1.2 REFERENCE STANDARDS**

- .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
  - .1 Notify Owner's Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Owner's Representative's inspection of the completed work.
- .2 The Contractor shall be responsible to retain a Land Surveyor, acceptable to the City, currently licensed to practice in the Province of Prince Edward Island, to complete or verify all recorded as-built survey information collected on the project.
- .3 Owner's Representative's Inspection: Accompany Owner's Representative during all substantial and final inspections of the Work.
  - .1 Address defects, faults and outstanding items of work identified by such inspections.
  - .2 Advise Owner's Representative when all deficiencies identified have been rectified.
- .4 Note that Owner's Representative will not issue a Certificate of Substantial Performance of the Work until such time that Contractor performs following work and turns over the specified documents:
  - .1 Compliance certificates from applicable authorities;
  - .2 Reports resulting from designated tests; and
  - .3 Record drawing information as outlined in Clause 1.4.
- .5 Correct all discrepancies before Owner's Representative will issue the Certificate of Completion.

### **1.3 AS -BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at site for Owner's Representative, one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.

- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Owner's Representative.

#### 1.4 **RECORD DRAWINGS**

- .1 Owner's Representative will provide two sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and record accurately deviations from Contract documents.
- .3 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to the Owner's Representative.
- .4 Record following information:
  - .1 Field changes of dimension, detail and elevation.
  - .2 Changes made by Change Order or Field Order.
  - .3 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.
- .5 At completion of project and prior to final inspection, neatly transfer "as-recorded" records to second set of white prints using fine, red marker. Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each drawing title block note: "AS-RECORDED" Also, circle on List of Drawings each title and number of drawing marked with "as-recorded" records.
- .6 Submit this set of "as-recorded" drawings to Owner's Representative.
- .7 Within thirty (30) working days of the completion of construction, the Contractor shall complete a topographic as-recorded survey of the project areas and submit the survey data in an acceptable format to the Owner's Representative.

- .8 If project is completed without significant deviations from contract drawings, declare this in writing and submit to Owner's Representative in lieu of record drawings.
- .9 The Owner's Representative will review the progress of the record drawings as part of each payment certificate authorization. Should the drawings not be properly updated, payment will be withheld for each payment certificate until the work is completed to the satisfaction of the Owner's Representative.
- .10 Provide digital photos, if requested, for site records.
- .11 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish road elevation.
  - .2 Measured horizontal and vertical locations of underground utilities, fittings, pipe inverts and appurtenances, referenced to permanent surface improvements.
  - .3 Field changes of dimension and detail.
  - .4 Changes made by change orders.
  - .5 Details not on original Contract Drawings.
  - .6 References to related shop drawings and modifications.

**1.5 FINAL SURVEY**

- .1 Submit final site survey certificate, prepared by a licensed surveyor, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

**1.6 MEASUREMENT FOR PAYMENT**

- .1 The work for this Section will not be measured for payment but will be incidental to the Work.

**Part 2 - Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 - Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION OF WORK**

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to strip topsoil from areas designated, complete excavation of all types of material encountered, placing of suitable excavated material as backfill in trenches and embankments, disposal of unsuitable material, spreading of suitable surplus material, and furnishing backfill material as specified below, all as shown on the Drawings and as specified.
- .2 The work generally includes, but is not necessarily limited to, the following items:
  - .1 Trench excavation and backfilling for structures, pipelines, ducts, footings and appurtenances.
  - .2 Structure excavation and backfilling for manholes and catchbasins.
  - .3 Control of water by dewatering.
  - .4 Providing borrow material when required.
  - .5 Removal and disposal of unsuitable and surplus material.
  - .6 Sheet piling, shoring, trench box and bracing to support trench walls, sides of excavations, existing structures or utilities.
  - .7 Stripping, stockpiling and replacing topsoil.

### **1.2 RELATED REQUIREMENTS**

- .1 Section 32 11 23 – Granular Surface
- .2 Section 32 98 00 – Reinstatement
- .3 Section 33 14 16 – Water Distribution System
- .4 Section 33 31 11 – Sanitary Sewer
- .5 Section 33 41 00 – Storm Sewer

### **1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .4 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

#### 1.4 DEFINITIONS

- .1 Excavation: excavation of materials of whatever nature including dense tills, hardpan, frozen materials, boulders, bedrock, debris and all other materials encountered on the site.
- .2 Topsoil:
  - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .4 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
- .5 Unsuitable materials:
  - .1 Weak, chemically unstable and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM C136: Sieve sizes to CAN/CGSB-8.2.
- .6 Unshrinkable backfill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
  - .1 At least 2 weeks prior to beginning Work, inform Owner's Representative of proposed source of bedding, backfill or cover materials and provide access for sampling.

#### 1.6 EXISTING CONDITIONS

- .1 Buried services:
  - .1 Before commencing work establish location of buried services on and adjacent to site.
  - .2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .3 Confirm locations of buried utilities by careful test excavations or soil hydrovac methods.

- .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
- .5 Record location of maintained, re-routed and abandoned underground lines.
- .6 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
  - .1 Conduct, with Owner's Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, property pins, survey benchmarks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Owner's Representative.

**1.7 COFFERDAMS, SHORING, BRACING AND UNDERPINNING**

- .1 Comply with Section 01 35 28 - Health and Safety Requirements and applicable local regulations.
- .2 Provide cofferdams, shoring, bracing and underpinning as required to prevent movement, failure or settlement, to safeguard and maintain integrity of structures, utilities, earth, benchmarks, services and adjacent grades.
- .3 Engage services of qualified Professional Engineer registered in the Province of Prince Edward Island to design, inspect and approve shoring equipment required for work.

**Part 2 - Products**

**2.1 MATERIALS**

- .1 All materials shall be supplied by the Contractor.
- .2 Common Borrow: where material additional to that obtained from excavation on site is required to complete trench backfilling, the Contractor will provide this material from his own sources as an extra to the Contract. Material shall meet the requirements of PEI TIR Division 206.
- .3 Select Backfill Material: approved material from site excavation or borrow pits. Such material shall be well graded, and composed of clean, uncoated particles free from lumps of clay, masonry, asphalt, stumps, trees, roots, sod, muck or other deleterious material with a maximum particle size of 150mm 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.
- .4 Class A Granular: shall be as per PEI TIR requirements for Class A, Division 401.
- .5 Bedding Sand Material: shall be as per PEI TIR requirements for Division 402.

- .6 Drainage Class D Material: shall be as per PEI TIR requirements for Class D, Division 401.
- .7 Select Borrow: shall meet the requirements of PEI TIR Division 206.
- .8 Rip Rap: Class 1 as per the requirements of PEI TIR Division 213.
- .9 Geotextile Fabric: Non-woven geotextile Terrafix 270R or equivalent.
- .10 Unshrinkable backfill: proportioned and mixed to provide:
  - .1 The maximum percentage passing the 80 µm sieve shall not exceed 9%.
  - .2 The Portland cement content shall be 25 kg/m<sup>3</sup>.
  - .3 The slump at point of discharge shall be minimum 150mm.
  - .4 The specified compressive strength at 28 days shall be maximum 1.0 MPa.
  - .5 The use of fly ash, in addition to the noted Portland cement content, may be used in such proportion so as not to exceed the specified compressive strength.
  - .6 Concrete aggregates: to CSA-A23.1/A23.2.

### **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, in accordance with PEI TIR and Department of Environment, Energy and Climate Action.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

#### **3.2 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement, curb or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

#### **3.3 PREPARATION/PROTECTION**

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage as per City of Charlottetown requirements.
- .3 Protect buried services that are required to remain undisturbed.

### 3.4 STRIPPING OF TOPSOIL

- .1 Strip all surficial vegetation, rootmat and topsoil.
- .1 Do not mix topsoil with subsoil.

### 3.5 STOCKPILING

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

### 3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Construct temporary works to depths, heights and locations as indicated or directed by the Professional Engineer responsible for the design of the cofferdams, shoring, bracing or underpinning.
- .2 During backfill operation:
  - .1 Unless otherwise indicated or as directed by Owner's Representative, remove sheeting and shoring from excavations.
  - .2 Do not remove bracing until backfilling has reached that specified by the Professional Engineer responsible for the design of the cofferdams, shoring, bracing or underpinning.
  - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500mm above toe of sheeting.
- .3 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .4 Upon completion of substructure construction:
  - .1 Remove cofferdams, shoring and bracing.
  - .2 Remove excess materials from site and restore conditions indicated or as directed by Owner's Representative.

### 3.7 TEMPORARY WATER CONTROL WORKS / DEWATERING

- .1 The Contractor shall design, supply, construct, operate, maintain and remove all temporary water control works required to complete the project.
- .2 The Contractor shall submit to the Owner's Representative for review, a plan for the temporary water control works, a minimum of 7 days before commencing Work.
- .3 The design of the temporary water control works plan shall include, but are not limited to:
  - .1 The flow capacity of the temporary water control works;



- .2 The proposed method, description and drawings of the temporary water control works designed to accommodate or exceed the minimum specified flow capacity of the temporary water control works;
- .3 The proposed method of monitoring stream flows and weather forecasts at the Work Area to anticipate stream flow increases; and
- .4 A precautionary Work Area clean-up procedure and mitigation measures to be implemented in advance of any stream flow increase anticipated to exceed the flow capacity of the temporary water control works, or when directed by the Owner's Representative.
- .4 Conduct dewatering operations in accordance with Section 01 35 43 - Environmental Protection.
- .5 Keep excavations free of water while Work is in progress.
- .6 Protect open excavations against flooding and damage due to surface run-off.
- .7 Dispose of water in a manner not detrimental to public and private property, or portion of Work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .8 The temporary water control works shall separate the Work Area from the flow of the watercourse and shall keep the Work Area dry. The temporary water control works shall also control the introduction of sediment and debris from the Work Area to the flow of the watercourse.
- .9 The Contractor is responsible for control and/or removal of any water entering the Work Area due to infiltration. Methods to remove infiltrated water may include the construction of sumps and pumping.
  - .1 If pumping is used as the method of temporary water control through the Work Area, the Contractor shall supply and maintain, ready on site, a second pumping system capable of accommodating the flow capacity of the temporary water control works.
    - .1 The second pumping system shall include, but not limited to, pumps and backup power supply.
- .10 The Contractor shall inspect the dewatering works after each rainfall and at least daily during periods of prolonged rainfall.
- .11 The Contractor shall monitor and ensure that the dewatering works operate in a functional condition continuously throughout the entire period of use, including evenings and weekends, and shall repair any damage to the dewatering works or parts thereof.
- .12 When the dewatering works are no longer required, the Contractor shall remove from the watercourse all materials pertaining to the dewatering works.

### 3.8 EXCAVATION

- .1 Carry out excavations and removals. Excavate to lines, grades, elevations and dimensions as indicated.

- .2 Remove rubble and other obstructions encountered during excavation.
- .3 Do not disturb soil within branch spread of trees or shrubs that are to remain.
  - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .4 For trench excavation, unless otherwise authorized by Owner's Representative in writing, do not excavate more than 30 m of trench in advance of installation operations. Dispose of surplus and unsuitable excavated material in approved location off site in accordance with PEI Environmental regulations.
- .5 Restrict vehicle operations directly adjacent to open trenches.
- .6 Dispose of surplus and unsuitable excavated material off site.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .9 Notify Owner's Representative when soil at bottom of excavation appears unsuitable and proceed as directed by Owner's Representative.
- .10 Obtain Owner's Representative approval of completed excavation.
- .11 Remove unsuitable material from trench bottom to extent and depth as directed by Owner's Representative.
- .12 Correct unauthorized over-excavation as follows:
  - .1 Fill under bearing surfaces and footings with approved structural fill compacted to 100% of the maximum dry density in accordance with ASTM D698.
  - .2 Fill under other areas compacted to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .13 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .14 Obtain excavation permit prior to starting any on-site excavations.

### 3.9 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum dry densities obtained from ASTM D698.
- .2 Provide minimum of 150mm bedding layer (or as noted otherwise on the Drawings) under pipes, cables, ducts, fittings and appurtenances. Bedding material shall be placed and compacted to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .3 Backfill: Compact trench backfill to underside of subbase course or of subgrade surface restoration in lifts not to exceed 200mm. Compact to a minimum of 95% of the maximum dry density in accordance with ASTM D698. Notify Owner's Representative four hours prior to backfilling of trenches.

- .4 Contractor must meet the compaction requirements for the type of fill used. Should settlement occur in the trench during the maintenance period, Contractor will be required to repair settled area and give an additional year of maintenance for that area.
- .5 Place unshrinkable backfill in areas as indicated.

### 3.10 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Owner's Representative has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 28 days to withstand earth and compaction pressure. Do not install earth or backfill until concrete has cured completely.
- .5 Place protective material layer under, around and over minor installations until 600mm of cover is provided. Dumping material directly on installations will not be permitted.
- .6 Place backfill materials of earth fill around structure in uniform layers not exceeding 200mm compacted thickness up to finish grade. Compact each layer replacing succeeded layer.
- .7 Where new services cross under existing services, compact bedding for existing service pipe to 150mm below bottom of pipe and provide a cast-in-place cradle for length of unsupported pipe.
- .8 Place unshrinkable backfill in areas as indicated.
  - .1 Consolidate and level unshrinkable fill with internal vibrators.

### 3.11 INSPECTION AND TESTING

- .1 The Contractor shall submit gradation curves for proposed materials to demonstrate compliance with specifications. Pay all costs for gradation curves.
- .2 Have an independent testing laboratory carry out testing of materials and compaction. Frequency of tests will be determined by Owner's Representative.

- .3 Where tests or inspections by designated testing laboratory reveal work not in accordance with Contract requirements, Contractor shall pay costs for additional tests or inspections as Owner's Representative may require to verify acceptability of corrected work.

### 3.12 LENGTH OF TRENCH TO BE OPENED

- .1 The maximum length of trench to be opened at one time or place shall be thirty metres (30m). In general, backfilling shall begin as soon as practicable after the bedding and pipe laying have been completed.
- .2 If work is stopped on the whole or any part of the trench and the trench is left open for any length of time in advance of the construction of the pipe lines, the Contractor shall, when directed by the Owner's Representative, refill such trench or part thereof and shall not again open up such trench or part thereof until the Contractor is ready to proceed with the construction of the pipe lines. Should the Contractor refuse, neglect or fail to completely refill such trench within twenty-four (24) hours after the receipt of notice in writing to do so, the Owner's Representative may order the refill of said trench, and the cost and expense thereof shall be charged to the Contractor.

### 3.13 RESTORATION

- .1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Owner's Representative.
- .2 Clean and reinstate areas affected by work as directed by Owner's Representative.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 32 11 23 – Granular Surface

### **1.2 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.3 DEFINITIONS**

- .1 Rock Excavation: excavation of:
  - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort with a Caterpillar D9 crawler bulldozer or equivalent to be considered integral with parent mass.
  - .2 Boulder or rock fragments measuring in volume 1 cubic metre or more.
  - .3 Frozen material will not be classified as rock.
- .2 Common Excavation: excavation of materials other than stripping encountered in the Work.
- .3 Stripping: excavation of organic material covering original ground.
- .4 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .5 Waste Material: material unsuitable for embankment or material surplus to requirements.
- .6 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.
- .7 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .8 Pavement structure: combination of layers of unbound or stabilized subbase, base, and asphalt or concrete surfacing.
- .9 Subgrade elevation: elevation immediately below pavement structure.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

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

## **Part 2 - Products**

### **2.1 MATERIALS**

- .1 Embankment materials require approval by Owner's Representative.
- .2 Material used for embankment not to contain organic matter, frozen lumps, weeds, sod, roots, logs, stumps, boulders larger than 150mm or any other unsuitable material.
- .3 Subbase shall be Select borrow as per PEI TIR requirements Division 206.
- .4 Granular base shall be Class A gravel as per PEI TIR requirements Division 401.
- .5 Structural fill shall be select borrow as per PEI TIR requirements Division 206.
- .6 Topsoil shall be as per PEI TIR requirements Division 212.
- .7 Obtain approval of excavated or graded material used as fill for grading work. Protect approved material from contamination. Excavated material can be used as fill in the roadway subgrade construction, provided specified compaction can be achieved.

## **Part 3 - Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that condition of substrate is acceptable for roadway embankment Work:
  - .1 Visually inspect substrate in presence of Owner's Representative.
  - .2 Inform Owner's Representative 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 from Owner's Departmental Representative.

### **3.2 COMPACTION EQUIPMENT**

- .1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.
  - .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
  - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.

### **3.3 WATER DISTRIBUTORS**

- .1 Apply water with equipment capable of uniform distribution.

### 3.4 STRIPPING (OF TOPSOIL)

- .1 Strip and stockpile vegetative matter/topsoil suitable for placement in the Works. Do not mix topsoil with subsoil.
  - .1 Remove clearing and grubbing debris from stripping. Dispose of unsuitable materials, such as trees, brush, stumps and fill or muck.
- .2 Use stripped/stockpiled material for reinstatement of all disturbed areas and remove surplus material from the site. Supply shortfall from own sources.
- .3 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim or remove from site if quantity exceeds ability to grade on site.

### 3.5 EXCAVATING

- .1 General:
  - .1 Notify Owner's Representative when waste materials are encountered and remove to depth and extent directed.
  - .2 Excavate all types of materials to lines and elevations indicated and as necessary for construction.
  - .3 Notify Owner's Representative if in doubt as to definition of material.
  - .4 Select method of excavation, support, and dewatering unless otherwise indicated or directed. Protect property and structures from damage.
  - .5 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial regulations whichever is more stringent.
  - .6 Where Subgrade requires undercutting, sub-excavation shall be carried out to the specified depth below subgrade on a plane parallel to the Subgrade cross-slope.
  - .7 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as directed by Owner's Representative.
  - .8 Excavate as required to carry out work.
    - .1 Do not disturb soil or rock below bearing surfaces.
    - .2 Notify Owner's Representative when excavations are complete.
    - .3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
- .2 Drainage:
  - .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
  - .2 Provide ditches as work progresses to provide drainage.
  - .3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.
- .3 Handle materials in a manner that will not endanger the public, personnel, property or the work. Do not reduce sight distances or obstruct roadways or utilities. Do not obstruct flow of surface drainage or natural watercourses.

- .4 Hauling of common excavation over Granular Base Courses shall not be permitted, unless authorized.
- .5 The Contractor shall shape ditches to the lines and grades specified, and any grade conditions that would cause water to pond shall be removed.
- .6 Take care to protect granular material from the elements.
- .7 Prior to the placement of any fill, the exposed subgrade surface must be allowed to dry and shall be proof rolled and compacted. The subgrade preparation should occur during dry weather. The Contractor is expected to work the fill materials including scarifying and drying as required to achieve a moisture content sufficient to achieve the specified minimum compaction.
- .8 All excavated materials shall become property of the Contractor and shall be disposed of outside the work site.
- .9 Borrow Excavation:
  - .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
- .10 Rock excavation:
  - .1 Notify Owner's Representative, when material appearing to conform to classification for rock is encountered, to enable measurements to be made to determine volume of rock.

### 3.6 DEWATERING

- .1 Keep bottom of excavation free of water by draining or pumping.
- .2 Dewater excavation in a manner which will not endanger stability of the work.
- .3 Dispose of water from excavation in a manner that is not injurious to property, public health or any operation of the work. Prevent water pumped out of an excavation from entering a watercourse or wetland. Discharge from pumped water shall be in a well vegetated area in excess of 30 metres from a watercourse or wetland.
- .4 Take precautions to prevent uplift of pipe or structures.

### 3.7 EMBANKMENTS

- .1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.
  - .1 Method used to be to be pre-approved in writing by Owner's Representative.
- .2 Break up or scarify existing road surface prior to placing embankment material.
- .3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized by Owner's Representative.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.



- .5 Drain low areas before placing materials.
  - .1 Place and compact to full width in layers not exceeding 200mm loose thickness. Owner's Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100mm.
- .6 Where material consists of rock:
  - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1m.
  - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.
  - .3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.
  - .4 Do not place boulders and rock fragments with dimensions exceeding 200mm within 300mm of subgrade elevation.
- .7 Deductions from excavation will be made for overbuild of embankments.

### 3.8 **COMPACTION**

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Deposit, spread, and level, embankment material in layers 200mm maximum thickness before compaction.
  - .1 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.
  - .2 Ensure required compaction for each layer before placing any material for next layer.
- .3 Use specialized compaction equipment supplemented by routing, hauling, and leveling equipment over each layer of fill.
- .4 Obtain written approval from Owner's Representative before using specialized compaction equipment such as tamping rollers, vibratory rollers, or other alternate compaction equipment that produces the required results.
- .5 Compact each layer to density not less than 95% of the maximum dry density in accordance with ASTM D698, except top 150mm of subgrade.
  - .1 Compact top 150mm to 100% of the maximum dry density in accordance with ASTM D698.
- .6 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

### 3.9 **PROOF ROLLING**

- .1 For proof rolling, use a fully loaded tandem axle truck having a gross weight not less than 25,000 kg and with the tires inflated to not less than 485 kPa.

- .2 Obtain written approval from Owner's Representative to use non-standard proof rolling equipment.
- .3 Proof roll at level in subgrade as indicated.
  - .1 If use of non-standard proof rolling equipment is approved, Owner's Representative to determine level of proof rolling.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
  - .1 Remove base, subbase and subgrade material to depth and extent as directed by Owner's Representative.
  - .2 Backfill excavated subgrade with common material and compact in accordance with this Section at no extra cost.

### 3.10 FINISHING

- .1 Shape entire roadbed to within 25mm of design elevations.
- .2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.
- .3 Remove rocks over 100mm in dimension from slopes and ditch bottoms.
- .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- .5 Round top of back slope 1.5 m both sides of top of slope.
- .6 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.
- .7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

### 3.11 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Owner's Representative.
- .2 Provide silt fences and erosion protection as required to mitigate and prevent impacts to adjacent properties.

**END OF SECTION**

## Part 1 - General

### 1.1 RELATED REQUIREMENTS

- .1 Section 32 12 16 – Asphalt Paving

### 1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - .2 ASTM C117, Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing.
  - .3 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .4 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

## Part 2 - Products

### 2.1 MATERIALS

- .1 Granular base: to meet PEI TIR Class A and the following requirements:

Sieve Size	Granular	Granular	Granular	Drainage
	Class A	Class B	Class C	Class D
50 mm	-	-	-	-
45 mm	-	-	100	100
38 mm	-	-	-	60 - 100
31.5 mm	100	100	87 - 100	40 - 100

Sieve Size	Granular	Granular	Granular	Drainage
	Class A	Class B	Class C	Class D
25 mm	95 - 100	95 - 100	80 - 96	20 - 65
19 mm	-	-	-	0 - 30
12.5 mm	50 - 83	50 - 83	45 - 83	0 - 20
4.75 mm	30 - 60	30 - 60	25 - 65	0 - 5
1.18 mm	15 - 40	15 - 43	-	-
600 µm	10 - 32	10 - 35	-	-
300 µm	5 - 22	5 - 26	5 - 22	-
75 µm	3 - 9	3 - 9	3 - 10	-

## 2.2 SHOULDER MATERIAL

- .1 Shoulder material shall be as per PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 211.

## Part 3 - Execution

### 3.1 PLACEMENT AND INSTALLATION

- .1 Place granular base after surface is inspected and approved by Owner's Representative.
- .2 Underlying material to be compacted to density not less than 100% of the maximum dry density in accordance with ASTM D698.
- .3 Placing:
  - .1 Construct granular base to depth and grade in areas indicated.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on clean unfrozen surface, free from snow and ice.
  - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
  - .5 Place material to full width in uniform layers not exceeding 150mm compacted thickness.
    - .1 Owner's Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
  - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
  - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .4 Compaction Equipment:
  - .1 Vibratory compaction equipment must be used and capable of obtaining required material densities on project.
- .5 Compacting:

- .1 Compact to density not less than 100% of the maximum dry density in accordance with ASTM D698.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density. If aggregate is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Owner's Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .6 Proof rolling:
  - .1 For proof rolling, use a fully loaded tandem axle truck having a gross weight not less than 25,000 kg and with the tires inflated to not less than 485 kPa.
  - .2 Obtain written approval from Owner's Representative to use non-standard proof rolling equipment.
  - .3 Proof roll at level in granular base as indicated.
    - .1 If use of non-standard proof rolling equipment is approved, Owner's Representative to determine level of proof rolling.
  - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
  - .5 Where proof rolling reveals areas of defective subgrade:
    - .1 Remove base, subbase and subgrade material to depth and extent as directed by Owner's Representative.
    - .2 Backfill excavated subgrade with common material and compact in accordance with this Section.
    - .3 Replace subbase and base material and compact in accordance with this Section.
  - .6 Where proof rolling reveals defective base or subbase, remove defective materials to depth and extent as directed by Owner's Representative and replace with new materials in accordance with this section at no extra cost.

### 3.2 SHOULDER MATERIAL PLACEMENT

- .1 The placement of shoulder material shall be carried out in a manner so as to avoid damage to the adjacent and surrounding roadbed.
  - .1 The Contractor shall be responsible, at their expense, to repair any damage to the adjacent and/or abutting finished surfaces resulting from this Work.
- .2 Shoulder material shall be placed by equipment specifically designed for that purpose.

- .1 Any shoulder spreader considered for the work shall be constructed so that it shall not place any shoulder material on the pavement.
- .2 Shoulder material shall not be bladed onto the roadway foreslope.
- .3 The Contractor shall produce a final graded surface having a uniform 4% cross-slope toward the ditch except on the outer edge of a super-elevated curve where the Contractor shall consult with the Owner's Representative for direction.
- .4 Where shoulder material is to be placed after paving, compaction of aggregate and borrow shall be achieved using an appropriate rubber-tired roller in accordance with PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 209, to 95% of the Standard Proctor Density in accordance with ASTM D698. The Owner's Representative may approve the use of an alternative type of roller if safe operation of a rubber-tired roller can not be achieved. Excess shoulder material shall be removed at the Contractor's own expense. All handwork required at driveways and intersecting roadways ,etc. must be completed immediately following the shouldering process.
- .5 The Contractor shall sweep any excess material from the paved surface
- .6 The shaping of the material shall be continued until it is well compacted, free from ruts, waves and undulations.

### 3.3 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 12mm of established grade and cross section but not uniformly high or low.

### 3.4 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Owner's Representative.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
  - .1 Submit to Owner's Representative, samples of material for sieve analysis at least 2 weeks prior to beginning Work.
- .3 Test and Evaluation Reports:
  - .1 Submit asphalt concrete mix design and trial mix test results to Owner's Representative at least 2 weeks prior to beginning Work.

## **Part 2 - Products**

### **2.1 MATERIALS**

- .1 Tack coat and asphalt cement shall be as per PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 500. Grade of asphalt cement shall be as recommended by an approved materials testing authority and accepted by PEI TIR.
- .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 Division 603 of the PEI TIR General Provisions and Contract Specifications for Highway Construction.
- .3 Composition of mixture: to grading and asphalt content requirements in Table 603-4, Division 603 of the PEI TIR General Provisions and Contract Specifications for Highway Construction. Base course asphalt shall be Mix Type A, thickness shown on the Drawings. Seal course asphalt shall be Mix Type B, thickness shown on Drawings.

### **2.2 EQUIPMENT**

- .1 Pavers:
  - .1 Mechanical self-powered pavers shall be capable of spreading mixture true to line, grade and cross-slope.

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- .2 Pavers shall be equipped with hoppers and distributing screws to place mixture evenly in front of the screeds.
  - .3 Pavers shall be equipped with vibrating screeds and shall be capable of spreading mixtures, without segregation and with a smooth and uniform textured surface, to the required thickness and in widths from 3m to 6.1m.
    - .1 Screeds shall be equipped with heaters which are capable of preheating the entire screed and screed extensions.
  - .4 The Contractor shall provide a 3m straight edge with each paver.
  - .5 Pavers shall be equipped with automatic screed controls.
    - .1 The longitudinal grade control shall be equipped to operate from either side of the paver and be capable of providing longitudinal grade control as well as matching longitudinal joints.
    - .2 The Contractor shall use a minimum 12 m ski/floating beam or an approved equivalent for longitudinal grade control.
    - .3 A calibrated slope indicator shall be installed in a readily visible location on each paver.
  - .6 Longitudinal grade control shall be used on all lifts.
  - .7 Vibrating hydraulic screed extensions and/or vibrating bolt-on screed extensions shall be used in placing mat widths greater than 3 m.
    - .1 Hydraulic strike off extensions are only acceptable when laying mats of irregular widths outside of the driving lanes.
    - .2 Screed cut off shoes may be used when placing widths less than 3m.
  - .2 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.
  - .3 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
    - .1 Boxes with tight metal bottoms.
    - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
    - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
    - .4 Use only trucks which can be weighed in single operation on scales supplied.
  - .4 Hand tools:
    - .1 Lutes or rakes with covered teeth for spreading and finishing operations.
    - .2 Straight edges, 4.5 m in length, to test finished surface.
  - .5 Pressure distributor:
    - .1 Distributor to be designed, maintained, equipped and operated that asphalt material 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.
- .6 Cold Planer: Self-powered with automatic longitudinal and transverse grade and slope controls. Equipped with a loading conveyor to facilitate removal of milled asphalt by truck.

### **Part 3 - Execution**

#### **3.1 GENERAL**

- .1 Coordinate, pay costs for and have Department of Transportation Infrastructure (PEI TIR) construction control testing requirements performed and ensure compliance with the General Provisions and Contract Specifications for Highway Construction.
- .2 The Contractor is required to notify the Owner's Representative in writing at least 24 hours in advance of the start of paving operations.

#### **3.2 EXAMINATION AND PREPARATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving.
- .2 Underlying material to be compacted to density not less than 100% of the maximum dry density in accordance with ASTM D698. Maximum lift thickness shall be 150mm.

#### **3.3 PLACING**

- .1 Prior to laying mix, clean surface of loose and foreign material.
- .2 Place asphalt concrete to thicknesses, grades and lines indicated unless otherwise directed by Owner's Representative. Carryout interface with existing asphalt as per PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 705.
- .3 Placing conditions:
  - .1 Place asphalt only when air temperature is above 5°C for base course, and 10°C for surface 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 hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .4 Place, roll, and compact asphalt concrete to Division 603, PEI TIR General Provisions and Contract Specifications for Highway Construction.

#### **3.4 THICKNESS AND FINISH TOLERANCES**

- .1 Thickness and finish tolerances shall be as per PEI TIR General Provisions and Contract Specifications for Highway Construction, Division 603.11.

**3.5 DEFECTIVE WORK**

- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required.
  - .1 If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.
- .2 Repair areas showing checking, rippling, or segregation.
- .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

**END OF SECTION**

**Part 1 - General**

**1.1 MEASUREMENT FOR PAYMENT**

- .1 Supply and application of water for dust control is incidental to the Work, to be included in overall tendered price.

**1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Supply water in quantities and at times as directed by Owner's Representative.

**Part 2 - Products**

**2.1 MATERIALS**

- .1 Water: potable to Owner's Representative's approval.

**Part 3 - Execution**

**3.1 APPLICATION**

- .1 Apply water with equipment approved by Owner's Representative at rate of 0.5 to 5.0 l/m<sup>2</sup> as appropriate when directed by Owner's Representative.
- .2 Apply water with distributors equipped with means of shut-off and with spray system to ensure uniform application.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 33 41 00 – Storm Sewer

### **1.2 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117, Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2 Canadian Standards Association (CSA International)
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
  - .2 CSA G30.5-M, Welded Steel Wire Fabric for Concrete Reinforcement.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Owner's Representative of proposed source of materials and provide access for sampling minimum 4 weeks prior to commencing work.
- .3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA A23.1.
- .4 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1 and that mix design is adjusted to prevent alkali aggregate reactivity problems.
- .5 The proposed mix proportions (design), certified by the Contractor or his agent, shall be submitted for review at least 5 Days before concrete production is due to start.

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## Part 2 - Products

### 2.1 MATERIALS

- .1 Portland cement and supplementary cementing materials to CSA A23.1.
- .2 Water: to CSA A23.1.
- .3 Aggregates: to CSA A23.1. Coarse aggregates to be normal density.
- .4 Air-entraining admixture: to CSA A23.1 and ASTM C260.
- .5 Curing Compound: to CSA A23.1 white.
- .6 Granular base: Granular Class A as per PEI TIR Division 401.
- .7 Non-staining mineral type form release agent: chemically active release agents containing compounds reacting with free lime to provide water-soluble soap.
- .8 Pre-formed expansion joint filler: to ASTM D1751, 12mm thick, non-extruding, resilient, bituminous type.
- .9 Polyethylene: shall be 6 mil.
- .10 Welded wire fabric shall be used for the reinforcement of concrete sidewalk in non-residential driveways or as directed by the Owner's Representative.
  - .1 The welded wire fabric shall be the standard style and the size of the mesh shall be 152mm x 152mm. The gauge number shall be 6. The metric designation is 152 x 152 MW18.7 x MW18.7 and the equivalent Imperial style is 6x6 6/6.
  - .2 The wire used in the manufacture of the welded wire fabric shall conform to CSA G30.5-M.

### 2.2 CONCRETE MIX

- .1 Proportion normal density concrete in accordance with CSA A23.1, to give following properties: for all concrete as indicated.
  - .1 Cement: use Normal Type 10 Portland cement.
  - .2 Minimum compressive strength at 28 days: 32 MPa.
  - .3 Minimum cement content: 400 kg/m<sup>3</sup>.
  - .4 Class of exposure: C-2.
  - .5 Nominal size of coarse aggregate: 20mm.
  - .6 Slump at time and point of discharge: 80mm ± 30mm.
  - .7 Air content: 5% to 8% maximum.
  - .8 Chemical admixtures: in accordance with CAN3-A266.4-M.
  - .9 Maximum water-cement ratio: 0.45.
- .2 Do not change concrete mix without prior approval of Owner's Representative. Should change in material source be proposed, new mix design will be provided to be approved by Owner's Representative.

- .3 Proportion concrete in accordance with CSA A23.1.

## 2.3 TACTILE WARNING SURFACE INDICATORS

- .1 Tactile warning surface tiles shall be of type cast-in-place replaceable (REP) with an inline truncated dome pattern, as manufactured by ADA Solutions Inc.
  - .1 Standard tile size to be 610mm x 1220mm.
  - .2 Colour of tiles shall be Federal Yellow (Y) per Federal Standard 595B Table IV, Color No. 33538.
- .2 The Contractor shall provide all tools, equipment and services required for satisfactory installation per manufacturer's instruction as Incidental Work. Equipment, which may be required include typical mason's tools, a 600mm long level with electronic slope Cast In Place Replaceable Tactile 6 readout, (2) 25-pound weights, and a rubber mallet with a piece of wood for tamping down the tactile warning surface tile(s).

## Part 3 - Execution

### 3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  - .1 Dispose of surplus and unsuitable excavated material off site.

### 3.2 GRANULAR BASE

- .1 Obtain Owner's Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base in maximum 150mm layers to not less than 100% of the maximum dry density in accordance with ASTM D698.

### 3.3 CONCRETE

- .1 Obtain Owner's Representative approval of granular base and reinforcing steel prior to placing concrete.
- .2 Forms shall conform to the requirements of CSA A23.1 and shall produce a final cross-section in compliance with the Detail Drawings.
  - .1 Equipment and forms shall be free from hardened concrete and foreign matter and shall be cleaned at frequent intervals.
- .3 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Owner's Representative can be demonstrated. Hand finish surfaces when directed by Owner's Representative.

- .1 The slip-form machine must meet the approval of the Owner's Representative and this approval process may require the casting of a test section to confirm the cross section and final product conforms to the Standard Section. The casting of a trial section shall be at no cost to the City.
- .2 Placement of the slip-form machine guide markers shall be the responsibility of the Contractor. Any adjustment required prior to placement shall be carried out at not cost to the City.
- .4 Concrete which arrives on the Site at a temperature of less than 10°C or more than 35°C shall not be placed and shall be rejected. There shall be no payment for rejected concrete.
- .5 The placing of concrete shall not be started until the Class "A" Granular base has been reviewed by the Owner's Representative.
- .6 Place concrete to proper line and grade to give the section required by the plans and typical sections.
- .7 Finish surfaces to prevent ponding.
- .8 Adequate material and labour shall be at the site prior to placement to carry out finishing and curing, including material to protect the concrete from damage by rain. These shall include waterproof paper or plastic sheeting. The plastic sheeting shall not be left to continue as the curing material.

### 3.4 CONCRETE SIDEWALK

- .1 Concrete sidewalk shall be constructed to the line and grades shown on the Drawings or laid out in the field and in accordance with the typical cross-sections shown on the Contract Drawings. Construction methods shall conform to the requirements of CSA A23.1.
- .2 Excavation for sidewalk, including the removal of existing sidewalk, (asphalt or concrete) shall be to the depth and width shown on the Contract Drawings.
- .3 All soft, yielding and otherwise unsuitable material shall be removed and replaced with suitable material. Filled sections shall be compacted to a minimum 95% maximum dry density in accordance with ASTM D698 and extend a minimum of 300mm outside the form lines.
- .4 Class "A" Granular base for sidewalk shall be crushed gravel to the required grades and shall be placed and compacted in accordance with Section 32 11 23. Minimum thickness of granular base shall be as per the Contract Drawings.
- .5 Water shall be applied to the Class "A" Granular base immediately prior to placing concrete so as to thoroughly moisten the aggregate base surface without the pooling of water. Water to be supplied by the Contractor shall be considered incidental to the Work.
- .6 Existing manholes, valves and/or curb boxes in the sidewalk shall be adjusted to finished elevations.

- .7 Sidewalks shall be to the widths specified on the Contract Drawings and, unless specified otherwise, a minimum of 125mm thick; 150mm thick under driveways. Welded wire fabric shall be used in concrete sidewalks at non-residential locations.
- .8 Concrete shall be placed while still plastic and workable. Using any partially hardened concrete will not be permitted.
- .9 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2mm deep, by drawing broom in direction normal to centreline.
- .10 Provide edging as indicated with 10mm radius edging tool.
- .11 The forms shall be so arranged as to give a finished surface slope of 2%. The direction of the slope will depend on local conditions, but in general it shall be toward the curb.
- .12 After the concrete has set sufficiently, the spaces in front and back of the sidewalks shall be refilled with suitable material approved by the Owner's Representative to the required elevation. The fill material shall be thoroughly compacted in layers.

### 3.5 TOLERANCES

- .1 Finish surfaces to within 3mm in 3 m as measured with 3 m straightedge placed on surface.

### 3.6 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete stiff, but still plastic, at intervals of 15 m.
- .2 Install expansion joints as indicated by Owner's Representative at intervals of 6 m.
- .3 When sidewalk adjacent to curb, make joints of curb, gutters and sidewalk coincide.

### 3.7 ISOLATION JOINTS

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints.
- .3 Seal isolation joints with sealant approved by Owner's Representative.

### 3.8 TACTILE WALKING SURFACE INDICATORS

- .1 Install tactile walking surface indicators at curb ramp edges, where indicated on drawings and as specifically directed by the Owner's Representative.



- .2 The Contractor shall be prepared to arrange for a technical representative of the supplier/manufacturer of the tactile walking surface indicators to be on site for the initial installation on the Contract to ensure that correct procedures are established.
- .3 The concrete shall be poured and finished, true and smooth to the required dimensions and slope prior to placement of the tactile walking surface indicators.
- .4 Tactile walking surface indicators shall be set and pressed into wet concrete to be level with the surrounding or adjacent surface.
- .5 To the maximum extent possible, the tactile walking surface indicators shall be oriented such that the rows of in-line truncated domes are parallel with the direction of the ramp. When multiple plates, regardless of size are used, the truncated domes shall be aligned between the tactile walking surface indicators and throughout the entire tactile walking surface indicators installation.
- .6 The tactile walking surface indicators shall be tamped or vibrated into the fresh concrete to ensure that there are no voids or air pockets, and the field level of the tactile walking surface indicators are flush to the adjacent concrete surface or as the Drawings indicate to permit proper water drainage and eliminate tripping hazards between adjacent finishes. The maximum height of the base plate shall not exceed 3mm.
- .7 Cleaning and protecting:
  - .1 Protect tactile walking surface indicators against damage during the construction period to comply with the manufacturer's specifications.
  - .2 Remove any wet concrete that may spill onto the tactile walking surface indicators.
  - .3 During and after the tactile walking surface indicator installation and the concrete curing stage, it is imperative that there are no walking, leaning or external forces placed on the tactile walking surface indicators to rock the plates, causing a void between the underside of the tactile walking surface indicators and the concrete substrate.
  - .4 Clean tactile walking surface indicators by method specified by tactile walking surface indicators manufacturer.

### 3.9 CURING

- .1 Apply curing or curing/sealing compound to finished surfaces at a rate recommended by manufacturer as soon as the water sheen has left the concrete surface.
- .2 Cure and protect concrete to CSA A23.1 unless noted otherwise.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

**3.10 DRIVEWAYS**

- .1 The Contractor shall be responsible for providing access to all driveway entrances after the concrete has attained sufficient strength by filling in excavated areas with gravel over the usable portion of the driveway entrances until asphalt reinstatement is completed.

**3.11 CONCRETE TESTING**

- .1 Contractor will test concrete once for each day concrete is poured. Each day's testing shall include field slump and air and 7, 28 and 56 day cylinder breaks to test for compressive strength. Test results will be considered representative of the complete days pour.

**3.12 DEFECTIVE CONCRETE**

- .1 If the concrete has been damaged in any way before complete set has taken place, or if any defects are discovered at any time prior to final acceptance of the work, i.e. cracking, vandalism, footprints, etc. or if the test on samples taken from the work fails to meet the specification requirements, the defective concrete shall be entirely removed to subgrade and replaced with new concrete at the expense of the Contractor. Concrete not placed to the required minimum thickness or width shall be removed and replaced at the Contractor's expense.

**3.13 CLEANING**

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

**END OF SECTION**

## Part 1 - General

### 1.1 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM D711, Standard Test Method for No-Pick-Up Time of Traffic Paint.
  - .2 ASTM D868, Standard Practice for Determination of Degree of Bleeding of Traffic Paint.
  - .3 ASTM D1155, Standard Test Method for Roundness of Glass Spheres.
  - .4 ASTM D1210, Standard Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage.
  - .5 ASTM D1214, Standard Test Method for Sieve Analysis of Glass Spheres.
  - .6 ASTM D1309, Standard Test Method for Settling Properties of Traffic Paints during Storage.
  - .7 ASTM E1347, Standard Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 1-GP-71, Method of Testing Paints and Pigments.
- .3 Transportation Association of Canada, Manual of Uniform Traffic Control Devices for Canada.
- .4 Prince Edward Island, Temporary Workplace Traffic Control Manual.
- .5 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## Part 2 - Products

### 2.1 MATERIALS

- .1 Paint:
  - .1 To Prince Edward Island Department of Transportation and Infrastructure (PEI TIR) requirements.

- .2 Glass Beads:
  - .1 To Prince Edward Island Department of Transportation and Infrastructure (PEI TIR) requirements.

### **Part 3 - Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings acceptable for product installation in accordance with manufacturer's instructions prior to pavement markings application.
  - .1 Visually inspect substrate in presence of Owner's Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions rectified.

#### **3.2 EQUIPMENT REQUIREMENTS**

- .1 Paint applicator: approved pressure type with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

#### **3.3 PRE-MARKING**

- .1 The Owner's Representative shall provide the pre-marking layout files to establish the position of the pavement markings, which shall be laid out by the Contractor.
- .2 The Contractor shall provide the measurements and control point marking on the pavement to establish the position of pavement marking as follows:
  - .1 Painted yellow dots along the centreline;
  - .2 Painted white dots to mark edgelines, including edgelines that are not parallel to centreline, as on tapers to auxiliary lanes.
- .3 Dots shall be 100mm in diameter and shall be placed at stations (longitudinal reference distance) of 20 m spacing on tangents or less as required for tapers to auxiliary lanes. In areas of horizontal curvature of the roadway, the spacing shall be 10 m.
- .4 The Contractor shall complete the Work within seven days of the completion of the Work under Section 32 12 16 – Asphalt Paving.
- .5 The Contractor shall notify the Owner's Representative at least one week prior to the Work under this Section, to allow the Owner's Representative to review the pre-marking layout.

### 3.4 TRAFFIC CONTROL

- .1 Traffic Control shall be the responsibility of the Contractor and shall be carried out in accordance with the Prince Edward Island Temporary Workplace Traffic Control Manual.

### 3.5 APPLICATION

- .1 Pavement markings: layout by Contractor.
- .2 Unless otherwise approved by Owner's Representative, apply paint when air temperature minimum 10°C, wind speed maximum 60 km/h and no rain forecast within next 4 hours.
- .3 Traffic line painting shall include centerline painting, lane line painting and edge line painting. The term centerline shall be used to describe any of the standard line combinations separating opposing traffic lanes and shall include the following:
  - .1 Single skip lines;
  - .2 Single skip and single solid lines;
  - .3 Double solid lines;
  - .4 Single solid line (occasionally a narrow local low volume road may have a single solid centerline).
  - .5 All such centerlines shall be yellow in colour.
- .4 The term lane line shall be used to describe any line separating lanes of traffic travelling in the same direction and may be either a single white skip line, dashed white line or a single white solid line.
- .5 The term edge line shall be used to describe any line which defines the shoulder edge of the outside traffic lanes.
- .6 Symbols, hatching and letters to dimensions and colours indicated.
- .7 The width of painted lines shall be 10 cm. Paint shall be heated to a temperature sufficient to enable it to dry when applied to the road, in a time frame short enough to avoid the use of traffic cones for protection of vehicles and the painted line itself. Paint shall be applied at a rate to achieve in one pass a minimum dry film thickness (dft) of 255 µm.
- .8 All lines are to be true with clearly defined edges and without noticeable overspray of adjacent road surfaces.
- .9 No painting shall be carried out when visible moisture is present on the road surface.
- .10 Lines not painted in accordance with these specifications shall be repainted by the Contractor at the expense of the Contractor.
- .11 The Contractor shall inform the Owner's Representative of the Contractor's daily schedule to enable the representative to be present as they deem it necessary during painting operations.

**3.6 TRAFFIC LINES**

- .1 All pavement lines and markings shall be in accordance with the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada (MUTCDC).

**3.7 TOLERANCE**

- .1 Paint markings: within plus or minus 12mm of dimensions indicated.
- .2 Remove incorrect markings in accordance with Owner's Representative's approval of methodology.

**3.8 PROTECTION**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION OF WORK**

- .1 This Section specifies requirements for providing topsoil and sod as specified.
  - .1 All topsoil to be obtained from an off-site source as approved by Owner's Representative.

### **1.2 REFERENCE STANDARDS**

- .1 Agriculture and Agri-Food Canada
  - .1 The Canadian System of Soil Classification
- .2 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA)
  - .1 Canadian Landscape Standard.
  - .2 Canadian Nursery Stock Standard.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

### **1.4 SCHEDULING**

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation after frost has left ground and before June 30<sup>th</sup> or between August 15<sup>th</sup> and September 30<sup>th</sup>.

## **Part 2 - Products**

### **2.1 TOPSOIL**

- .1 Topsoil: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 Friable loam, neither heavy clay nor of very light sandy nature, containing minimum 4% organic matter for clay loam, and 2% for sandy loam, to maximum 20% by volume.
  - .2 Contain no toxic elements or growth inhibiting materials.
  - .3 Free from debris, subsoil, vegetation, and stones and roots over 50mm diameter.

### **2.2 SOIL AMENDMENTS**

- .1 Fertilizer:
  - .1 Complete, commercial, with 35% soluble nitrogen.

- .2 To Canada "Fertilizers Act" and "Fertilizers Regulations".
- .3 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.
- .2 Peatmoss:
  - .1 Derived from partially decomposed species of horticultural grade Sphagnum Mosses.
  - .2 Elastic and homogeneous, brown in colour.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particle minimum size: 5mm.
- .3 Limestone:
  - .1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.
  - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

## 2.3 NURSERY SOD

- .1 Number One Turfgrass Nursery Sod: Sod that has been especially sown and cultivated in nursery fields as turfgrass crop.
  - .1 Turfgrass Nursery Sod: Number One Kentucky Bluegrass Sod - Fescue Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivar(s).
  - .2 Turfgrass Nursery Sod quality:
    - .1 Not more than 2 broadleaf weeds or 10 other weeds/40 m<sup>2</sup>.
    - .2 Density of sod sufficient so that no soil is visible from height of 1500mm when mown to height of 40mm.
    - .3 Mowing height limit: 35mm to 6mm.
    - .4 Soil portion of sod: 9 to 15mm in thickness.

## 2.4 WATER

- .1 Water: potable, free of impurities.

## 2.5 SOURCE QUALITY CONTROL

- .1 Obtain approval from Owner's Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization.
- .3 Advise Owner's Representative of source of topsoil to be used 7 days in advance of starting Work.
- .4 Contractor is responsible for soil analysis requirement for amendments to topsoil as specified.



### **Part 3 - Execution**

#### **3.1 PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct.
  - .1 If discrepancies occur, notify Owner's Representative and do not start work until instructed by Owner's Representative.
- .2 Grade soil, eliminate uneven areas and low spots, ensure positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50mm diameter and other deleterious materials.
  - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  - .2 Remove debris which protrudes more than 75mm above surface.
  - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100mm.
  - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

#### **3.2 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL**

- .1 Place topsoil after Owner's Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 100mm.
- .3 Keep topsoil 15mm below finished grade for sodded areas.
- .4 Manually spread topsoil around trees, shrubs and obstacles.
- .5 Avoid spreading or grading in wet, frozen, or saturated state.

#### **3.3 SOIL AMENDMENTS**

- .1 Apply and thoroughly mix soil amendments and fertilizer into full specified depth of topsoil as determined by soil analysis.

#### **3.4 FINISH GRADING**

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

#### **3.5 ACCEPTANCE OF TOPSOIL**

- .1 Owner's Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material subject to soil testing and analysis.

- .2 All costs for soil testing and analysis to be borne by Contractor.

### 3.6 PREPARATION FOR SODDING

- .1 Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice, or standing water.
- .2 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated, to tolerance of plus or minus 9mm for Turfgrass Nursery Sod, surface to drain naturally.
- .3 Remove and dispose of weeds; debris; stones 50mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.
- .4 Cultivate fine grade approved by Owner's Representative to 25mm depth immediately prior to sodding.

### 3.7 SOD PLACEMENT

- .1 Lay sod within 36 hours of being lifted.
- .2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Roll sod as directed by Owner's Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

### 3.8 FERTILIZING PROGRAM

- .1 Fertilize during establishment and period of maintenance to following program:

<u>Date</u>	<u>Rate</u>	<u>Ratio</u>
May	70 kg/ha	3:0:0
July	70 kg/ha	3:1:3
September	25 kg/ha	1:2:3

### 3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following maintenance operations from time of installation until acceptance:
  - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100mm.
  - .2 Cut grass to 40mm when it reaches height of 65mm. Remove clippings which will smother grass. Grass to be mowed twice.
  - .3 Maintain sodded areas weed free.
  - .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

### 3.10 ACCEPTANCE OF SOD

- .1 Turfgrass Nursery Sod areas will be accepted by the Owner's Representative provided that:
  - .1 Sodded areas are properly established.
  - .2 Sod is free of bare and dead spots and without weeds.
  - .3 No surface soil is visible from height of 1500mm when grass has been cut to height of 40mm.
  - .4 Sodded areas have been cut minimum 3 times, and within 24 hours prior to acceptance.
  - .5 Fertilizing in accordance with fertilizer program has been carried out at least once.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

### 3.11 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of maintenance period:
  - .1 Lime, fertilize and mow sodded areas in Spring after acceptance.
- .2 Repair and re-sod dead or bare spots to approval of Owner's Representative.
- .3 Grass warranty period shall be 12 months from acceptance.

**END OF SECTION**

## **Part 1 - General**

### **1.1 DESCRIPTION OF WORK**

- .1 This Section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary for the complete reinstatement of surfaces and structures disturbed by work of this Contract.
- .2 Repair damage or disturbance to surfaces, properties and structures, within limits of the Site or elsewhere on other properties occupied, traversed or otherwise used by the Contractor during the Contract period to a condition equal to or better than that before work began, at no additional cost to the Contract.

### **1.2 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 31 24 13 – Roadway Embankments
- .3 Section 32 11 23 – Granular Surface
- .4 Section 32 12 16 – Asphalt Paving
- .5 Section 32 16 00 – Concrete Sidewalks, Curbs and Gutters
- .6 Section 32 17 23 – Pavement Markings
- .7 Section 32 91 23 – Topsoil and Sodding

### **1.3 REFERENCE STANDARDS**

- .1 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.4 MAINTENANCE**

- .1 Contractor shall take care and maintain all reinstated areas until final acceptance of the work.
- .2 Repair damaged areas to the approval of the Owner's Representative.

### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

## **Part 2 - Products**

### **2.1 MATERIALS**

- .1 Granular material: in accordance with the requirements of Section 31 23 33.01 – Excavation, Trenching and Backfill.
- .2 Concrete material: as specified in Section 32 16 00 – Concrete Sidewalks, Curbs and Gutters.
- .3 Asphalt material: as specified in Section 32 12 16 – Asphalt Paving.

- .4 Pavement markings: as specified in Section 32 17 23 – Pavement Markings.
- .5 Grass surface materials: as specified in Sections 32 91 23 – Topsoil and Sodding.

### **Part 3 - Execution**

#### **3.1 GENERAL**

- .1 Maintain surfaces to be reinstated level with adjoining existing surfaces gravel until final reinstatement.

#### **3.2 CONCRETE SURFACES**

- .1 Carry out final reinstatement of concrete surfaces as follows:
  - .1 Cut back broken edges of original pavement to full depth, in straight lines.
  - .2 Before placing final surface material, remove existing gravel to a depth indicated over disturbed area, grade and recompact. Add gravel to compacted depths indicated. Compact to not less than 100% of the maximum dry density in accordance with ASTM D698.
  - .3 Place and finish concrete in accordance with Section 32 16 00 – Concrete Sidewalks, Curbs and Gutters.
  - .4 Ensure finished surface is even, dense and matches grade of existing road or surface, as approved by the Owner's Representative.

#### **3.3 ASPHALT SURFACES**

- .1 Keep surface of asphalt paved roads and surfaces in good condition by repairing settlement of trench backfilling as described in Section 31 23 33.01 – Excavation, Trenching and Backfill.
- .2 Carry out final reinstatement of asphalt surfaces as follows:
  - .1 Cut back broken edges of original pavement to full depth, in straight lines. Cut back 300mm minimum from edge of excavation to eliminate tension cracks. Clean contact surfaces and apply tack coat before placing asphalt concrete.
  - .2 Before placing final surface material, remove existing gravel to a depth indicated over disturbed area, grade and recompact. Add gravel to compacted depths indicated. Compact to not less than 100% of the maximum dry density in accordance with ASTM D698.
  - .3 Supply, place, roll and compact asphalt mixture in accordance with Section 32 12 16 – Asphalt Paving.
  - .4 Compact asphalt concrete in lifts not exceeding 50mm in thickness.
  - .5 Ensure finished surface is even, dense and matches grade of existing road or surface, as approved by the Owner's Representative.

**3.4 PAVEMENT MARKINGS**

- .1 Reinstall existing pavement markings in locations as directed by the Owner's Representative.

**3.5 SIGNS AND SIGN POSTS**

- .1 Relocate existing signs and sign posts to locations as directed by the Owner's Representative.

**3.6 GRAVEL SURFACES**

- .1 Reinstall gravel surfaces by placing 200mm compacted thickness of gravel at an elevation such that gravel surface is smooth and even with adjacent surfaces.
- .2 Place and compact gravel for surfaces in accordance with the requirements of PEI TIR General Provisions and Contract Specifications for Highway Construction.

**3.7 GRASS SURFACES**

- .1 Sodding: to Section 32 91 23 – Topsoil and Sodding. Fine grade areas to be reinstated to smooth surface. Grade to allow for topsoil and sod to be placed so finish grade is smooth and even with existing surfaces.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling

### **1.2 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A48, Standard Specification for Gray Iron Castings.
  - .2 ASTM C478M, Standard Specification for Circular Precast Reinforced Concrete Manhole Sections (Metric).
  - .3 ASTM C478M, Standard Specification for Circular Precast Reinforced Concrete Manhole Sections (Metric).
  - .4 ASTM C858, Standard Specification for Underground Precast Concrete Utility Structures.
  - .5 ASTM C1244M, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
  - .2 CSA A257, Standards for concrete pipe and manhole sections
  - .3 CSA A3000, Cementitious Materials Compendium
  - .4 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
  - .5 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings, manufacturer's test data and certification that materials meet requirements of this Section at least 2 weeks prior to commencing work. Include manufacturer's drawings, information and shop drawings for all manholes and catch basins.

## **Part 2 - Products**

### **2.1 MATERIALS**

- .1 Precast manhole and catch basin units: to ASTM C478M, circular.
  - .1 Top sections eccentric cone where identified on Drawings.
  - .2 Precast bases to be approved by Owner's Representative.
- .2 Joints: to be made watertight using integral rubber O-rings.
- .3 Mortar:

- .1 Cement: to CSA A3000.
- .4 Adjusting rings: to ASTM C478M.
- .5 Frames, gratings, covers to dimensions as indicated and following requirements:
  - .1 Metal gratings and covers to bear evenly on frames.
    - .1 Frame with grating or cover to constitute one unit.
    - .2 Assemble and mark unit components before shipment.
  - .2 Gray iron castings: to ASTM A48.
  - .3 Bearing surfaces to be ground to eliminate surface imperfections.
  - .4 Manhole/catch basin frames and covers: heavy duty municipal type for road service and as indicated on the Drawings.
    - .1 Adjustable manhole frames and covers:
      - .1 Acceptable product: Adjustable manhole frames and covers shall be Cone Shaped Frame / Autostable C-56M as manufactured by Bibby-Ste-Croix, Laperle, or approved equivalent, meeting the requirements of CSA B70.1. The adjustable frame be supplied with a R-10 cover to form a complete unit.
    - .2 Standard catch basin frames and covers:
      - .1 Acceptable product: R-10 frame and R-11 grate as manufactured by IMP Group Ltd., meeting the requirements of CSA B70.1.
    - .3 Standard manhole frames and covers (off roadway only):
      - .1 Acceptable product: R-10 frame and grate with as manufactured by IMP Group Ltd., meeting the requirements of CSA B70.1.
    - .4 Double catch basin frames and covers:
      - .1 Acceptable product: S401 or S411 double frame with grates (597mm x 597mm) as manufactured by Bibby Laperle, meeting the requirements of CSA B70.1.
  - .5 Sanitary manhole covers shall be marked "SANITARY".
- .6 Ladder rungs: to CSA G30.18, No. 25M billet steel deformed bars, hot dipped galvanized to CSA G164.
  - .1 Rungs to be safety pattern (drop step type).
- .7 Precast sluice boxes: to ASTM C478M with pre-cut holes of sufficient size to suit the pipe lateral.
- .8 Granular bedding: Class A in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .9 Unshrinkable backfill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.



- .10 Sanitary manhole waterproofing: All internal joints in sanitary manholes are to be sealed using butyl rope (ConSeal CS-202), then the exterior joint wrapped with a polyolefin backed exterior joint wrap (ConSeal CS-212) and then the complete exterior of the sanitary manhole shall be Blueskin wrapped. Additionally, all lift holes for precast manhole sections shall be grouted prior to the manhole being wrapped in Blueskin.

### **Part 3 - Execution**

#### **3.1 EXCAVATION AND BACKFILL**

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Owner's Representative before installing manholes or catch basins.

#### **3.2 INSTALLATION**

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses.
- .3 Dewater excavation as directed by Owner's Representative and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete base on 150 mm minimum of granular bedding compacted in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .5 Precast units:
  - .1 Set precast concrete base on 150 mm minimum of granular bedding compacted in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
  - .2 Set riser sections on precast base and make joint watertight with O-ring gaskets. Grout joints inside and out with non-shrink grout.
  - .3 Plug lifting holes with non-shrink grout.
- .6 For sewers:
  - .1 Place stub outlets at elevations and in position indicated. Provide type of gasket connection as indicated.
  - .2 Install manhole benching where shown on the Drawings using concrete suitable for exposure classification C-2 as specified in CSA A23.1
- .7 Compact granular backfill to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .8 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .9 Install frames and covers on applicable top sections to elevation shown on Drawings or as directed.

- .10 Clean units of debris and foreign materials.
  - .1 Remove fins and sharp projections.
  - .2 Prevent debris from entering system.

### 3.3 ADJUSTING TOPS OF EXISTING UNITS

- .1 Remove existing gratings and frames and store for re-use at locations designated by Owner's Representative.
- .2 Sectional units:
  - .1 Raise or lower straight walled sectional units by adding or removing precast sections as required.
  - .2 Raise or lower tapered units by removing cone section, adding, removing, or substituting riser sections to obtain required elevation, then replace cone section.
    - .1 When amount of raise is less than 600 mm use grade rings.
    - .2 When amount of raise is less than 150 mm use standard steel risers.

### 3.4 FIELD TESTING OF SANITARY SEWER MANHOLES

- .1 All sanitary sewer manholes installed shall be leakage tested either by water test or air tightness test. All tests shall be conducted by the Contractor, in the presence of the Owner's Representative. The Contractor shall notify the Owner's Representative at least forty-eight (48) hours in advance of performing any tests.
- .2 The Contractor shall provide all labour, equipment and materials required to provide leakage tests on sanitary manholes.
- .3 Should any sanitary manhole test prove unsatisfactory, the Contractor shall excavate to determine the cause, make repairs, backfill and retest at his own expense.
- .4 The Contractor shall follow the procedures for testing as outlined in ASTM C1244M and the following:
  - .1 Conduct testing one manhole at a time.
  - .2 All lift holes shall be plugged, pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.
  - .3 The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
  - .4 A vacuum of 33.8 kPa (5 psi) of Hg shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 30.4 kPa (4.4 psi) of Hg.
  - .5 The manhole shall pass if the time for the vacuum reading to drop from 33.8 kPa (5 psi) of Hg to 30.4 kPa (4.4 psi) of Hg meets or exceeds the values indicated in Table 3.4-1.

**TABLE 3.4-1 - Minimum Test Times for Various Manhole Diameters in Seconds**

Diameter, mm					
Depth, m	1050	1200	1350	1500	1800
Time, in seconds					
2.4	17	20	23	26	33
3.0	21	25	29	33	41
3.7	25	30	35	39	49
4.3	30	35	41	46	57
4.9	34	40	46	52	67
5.5	38	45	52	59	73
6.1	42	50	58	65	81
6.7	46	55	64	72	89

### 3.5 CLEANING

- .1 Upon structure adjustment, removal of catchment device and all works associated with restoration around the structure, the Contractor shall provide all testing equipment, labour, incidentals, traffic control, etc., required to undertake an inspection of the system to verify its cleanliness. This inspection must be done in the presence of the Owner's Representative.

**END OF SECTION**

## Part 1 - General

### 1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 32 11 23 – Granular Surface

### 1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI B1.20.1, American National Standard Straight Pipe Threads.
  - .2 ANSI B16, Gray Iron Pipe Flanges And Flanged Fittings: Classes 25, 125, And 250.
  - .3 NSF/ANSI 61, Drinking Water System Components.
- .2 American Water Works Association (AWWA)
  - .1 AWWA B300, Hypochlorites.
  - .2 AWWA B301, Liquid Chlorine.
  - .3 AWWA B303, Sodium Chlorite.
  - .4 AWWA C105, Polyethylene Encasement for Ductile Iron Pipe Systems.
  - .5 AWWA C110, Ductile-Iron and Grey Iron Fittings.
  - .6 AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - .7 AWWA C150, Thickness Design of Ductile-Iron Pipe.
  - .8 AWWA C151, Ductile-Iron Pipe, Centrifugally Cast.
  - .9 AWWA C153, Ductile-Iron Compact Fittings.
  - .10 AWWA C200, Steel Water Pipe, 6 In. (150mm) and Larger.
  - .11 AWWA C203, Coal Tar Protective Coatings and Linings for Steel Water Pipes.
  - .12 AWWA C206, Field Welding of Steel Water Pipe.
  - .13 AWWA C207, Steel Pipe Flanges for Waterworks Service, 4 In. through 144 In. (100 mm through 3,600 mm).
  - .14 AWWA C208, Dimensions for Fabricated Steel Water Pipe Fittings.
  - .15 AWWA C500, Metal-Seated Gate Valves for Water Supply Service.
  - .16 AWWA C504, Rubber-Seated Butterfly Valves.
  - .17 WWA C509, Resilient-Seated Gate Valves For Water Supply Service.
  - .18 AWWA C600, Installation of Ductile-Iron Mains and Their Appurtenances.
  - .19 AWWA C651, Disinfecting Water Mains.
  - .20 AWWA C800, Underground Service Line Valves and Fittings.
  - .21 AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. through 60 In. (100mm Through 1500mm).

- .22 AWWA C906, Standard for Polyethylene (PE) Pressure Pipe and Fittings 4 in. Through 63 in., for Water Distribution, NSF 14,61.
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
  - .2 ASTM A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.
  - .3 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
  - .4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>)).
  - .5 ASTM F714, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.
- .4 American Water Works Association (AWWA)/Manual of Practice
  - .1 AWWA M11, Steel Pipe - A Guide for Design and Installation.
  - .2 AWWA M17, Fire Hydrants: Installation, Field Testing, and Maintenance.
  - .3 AWWA M31, Distribution System Requirements for Fire Protection.
- .5 Canadian Standards Association (CSA)
  - .1 CAN B137 Series, Thermoplastic Pressure Piping Standards Package.
- .6 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S520, Standard for Fire Hydrants.
  - .2 CAN/ULC-S543, Standard for Internal-Lug, Quick Connect Couplings for Fire Hose.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Product Requirements.
- .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 in dry location off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect materials from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

## 1.5 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Owner's Representative.
- .3 Notify Owner's Representative in writing a minimum of 72 hours in advance prior to connecting to or locating existing water mains or in advance of any interruption in service.
- .4 The Owner's Representative shall coordinate with the City regarding schedules, methods and procedures to be followed for isolating sections of the water system and connecting to existing water mains.
- .5 Notify Public Works and Fire Department of planned or accidental interruption of water supply to hydrants.
- .6 Advise emergency service providers of anticipated interference with movement of traffic.
- .7 Do not excavate near any existing water mains unless the exact location of all system valves have been determined and these valves have been tested and operated by the City.
- .8 Under no circumstances whatsoever shall the Contractor operate existing water main valves, fire hydrants, or make connections to existing water mains without the prior approval of the City. Normally, the opening and closing of the valves will be conducted from 8:30 to 15:00 Monday to Friday.
  - .1 All requests to use a fire hydrant or to operate a main valve will have to be done at least 24 hours in advance.
- .9 Provide and post "Out of Service" sign on hydrant not in use.

## Part 2 - Products

### 2.1 GENERAL

- .1 All materials shall be supplied by the Contractor.
- .2 Diameter, material and strength class of pipe and fittings: as indicated.

### 2.2 POLYVINYL CHLORIDE PIPE AND FITTINGS

- .1 Polyvinyl chloride pressure pipe: to CSA B137.3-M, AWWA C900 or AWWA C905, Pressure Class 150, DR18 with ductile iron equivalent outside diameters, blue in colour with integral bells. Push-on joint with continuous rubber-moulded ring gasket to AWWA C111.

- .1 Joints to be bell and spigot type with integral rubber gasket. This is a push-on joint and must be watertight. The bell will be an integral and homogenous part of the pipe barrel. Joints for PVC water pipe shall conform with ASTM D3139 and AWWA C900.
- .2 Molecularly Oriented Polyvinyl Chloride (PVCO) (Bionax or approved equal): CSA B137.3.1 and AWWA C909-09 certified with Ductile Iron equivalent outside diameters, blue in colour with integral bells, and pressure rated to 1620 kPa (235 psi).
- .3 When using PVC/PVCO pipe, all fittings to be installed using grade 304 stainless steel bolts and nuts.
- .4 Approved pipe up to and including 450mm diameter is to arrive on site with factory-installed endcaps on both pipe ends and a tamper evidence seal on the bell end only.
  - .1 Tamper evidence seals will display the manufacturer's name and/or logo. Seals will straddle the cap and/or tape and the pipe. Removal of the cap should render the tamper-evident seal unusable either by breaking the seal off or by leaving a message such as "Void" on the pipe.
- .5 Endcaps shall be installed at the factory and must be one of the following:
  - .1 White, clear, or black plastic discs or cone shaped plugs fastened with tape.
  - .2 Closed cell polypropylene foam (Charma Caps).
  - .3 Polyethylene pipe plugs (by Taylor Made).

## 2.3 FITTINGS, RETAINING GLANDS & COUPLINGS FOR PVC PIPE

- .1 Fittings 200mm in diameter or smaller such as tees, bends, crosses, caps, and reducers shall be Class 150 PVC injection-molded fittings for DR18 conforming to CSA B137.3, unless specified otherwise.
  - .1 PVC fittings shall be fabricated from segments of AWWA C900 Class 150 PVC pipe bonded together and overwrapped with fiberglass reinforced polyester.
- .2 Fittings of 250mm diameter or larger shall be ductile iron fittings meeting the requirements of AWWA C153, 2415 kPa class.
- .3 Mechanical joints for all fittings shall be complete with rubber gaskets without lead tip and with double duct backing, stainless steel bolts with nuts, unless otherwise specified.
- .4 Mechanical joint sleeves shall be to AWWA C110 or C153 Long sleeve length.
- .5 The pressure rating must match the pipe and fittings must meet the requirements of CSA B137.3.
- .6 Retaining Glands for PVC/PVCO pipe shall be UL listed and FM approved from the following list;
  - .1 Uniflange series 900, 1300, 1350, 1390.

- .2 Megalug series 2000.
- .3 Sigma One-Lok.
- .4 Sigma PV-Lok.
- .5 STAR PVCGRIP Series 3500.
- .6 STAR PVC Stargrip Series 4000.
- .7 Clow Restrainers 300, 350, 360, or 390.
- .8 U.S. Pipe MJ Field Lok Series PV.
- .9 TUF Grip Dual Wedge Series 1500.
- .10 Smith-Blair Cam-lock 120.
- .11 Ford SO-EZ RCPP.
- .12 Ford SO-EZ RCDP
- .7 Watermain couplings shall be Dresser, Romac or approved equal. Couplings shall be epoxy coated ductile iron complete with stainless steel bolts and nuts.
- .8 Stainless steel saddles for PVC/PVCO pipe shall be full circle seal with a minimum laying length (length of saddle) of 300mm are required, complete with stainless steel bolts and nuts. Approved saddles are:
  - .1 Smith-Blair/Rockwell No. 238
  - .2 Mueller Series 540
  - .3 Romac SS1
  - .4 Clow/Concord D-76R
  - .5 Robar 5616
  - .6 Ford FS1

## 2.4 GATE VALVES

- .1 Gate valves shall meet the requirement of the latest AWWA C509 or AWWA C515 resilient seated gate valves. Valves will be epoxy coated, iron body, brass mounted with non-rising stems, and come complete with steel tee bolts and nuts and a 50mm square operating nut. Valves to be McAvity, Clow, Mueller, or approved equal and are to open counter clockwise and be complete with component parts.

## 2.5 BUTTERFLY VALVES

- .1 Butterfly valves shall be used for all valves greater than 300mm diameter.
- .2 All butterfly valves shall be short body, Class 150B, of the rubber-seated tight-closing type, designed, manufactured, tested, and conforming to the latest AWWA C504 Standard.
- .3 Both valve ends shall be mechanical-joint (unless Class 125 flanged ends to ANSI V16.1 are specified) as per AWWA C111. Accessories (bolts, glands, and gaskets) shall be supplied by the valve manufacturer. Flanges are to be drilled and faced in accordance with ANSI B16.1 Class 125.



- .4 All valves must use full AWWA C504 Class 150B valve shaft diameter and full Class 150B underground-service-operator torque rating throughout entire travel to provide capability for operation in emergency service.
- .5 Valve body shall be cast-iron with mechanical joint ends. Mechanism shall be cast-iron, cast steel, alloy cast-iron or ductile-iron disc, type 304 stainless steel shafts to ASTM A276, rubber seated for positive shut-off at minimum 1 MPa differential pressure, either direction.
- .6 The valve body is to be epoxy coated both on the interior and exterior with minimum of 150 microns coating. All valve coatings shall be NSF approved.
- .7 Valve:
  - .1 Rubber seat shall be a full circle, 360 degrees, not penetrated by the valve shaft. Valve shaft shall be one piece, 304 stainless steel, extending full size through the entire valve and operator with no neck-down, keyways or holes to weaken it. Valve disc shall rotate 90 degrees.
- .8 Operator:
  - .1 Valve operator shall be of the traveling-nut type, sealed, gasketed, and lubricated for underground buried service. It shall be capable of withstanding an overload input torque of 610 Nm at full-open or closed position without damage to the valve or valve operator. It shall be designed to resist submergence in water to 7.5 m head pressure. Number of turns to operate valve (350mm to 500mm) shall be 30 to 50 turns to close in order to closely resemble conventional distribution valve practices, and to minimize water hammer.
- .9 Valves shall be capable of easy closure by one person using standard valve key, even under emergency line-break conditions as severe as those that would cause a valve maximum opening torque requirement of as much as two (2) times AWWA Class 150B Standard.
- .10 All valves shall open clockwise (right), and be equipped with 50mm AWWA operating nut. Valve operator shall have easily adjusted stops in both open and closed positions.
- .11 Acceptable Products:
  - .1 Clow M&H Style 4500 and 1450
  - .2 Mueller Lineseal III
  - .3 Pratt

## 2.6 TAPPING SLEEVES

- .1 Tapping sleeves shall be stainless steel complete with stainless steel bolts and nuts tightened using a torque wrench to the manufacturer's specification providing a complete seal around the circumference of the pipe. A concrete thrust block is required. The following stainless steel tapping sleeves with ductile iron outlet flanges will be acceptable:
  - .1 Ford Fast

- .2 Smith-Blair/Rockwell #662
- .3 Romac "SST"
- .4 Mueller model H304
- .5 Robar 6606 Lifter bar
- .2 Tapping valves shall be the resilient-seated type, meeting the requirements of AWWA Standard C509 or 515 for gate valves. Tapping valves shall have a flanged mechanical joint, complete with high-tensile steel tee bolts and nuts, tightened using a torque wrench to the manufacturer's specification and shall be AVK, McAvity, Mueller, or approved equivalent.

## 2.7 VALVE BOXES

- .1 Valve boxes: to AWWA C500 and as follows:
  - .1 Two piece sliding type with cover and centering disc, adjustable for depth of pipe below finished grade.
  - .2 Covers marked "WATER".
  - .3 Lugged to prevent turning and rolling of cover and cover notched to suit.
  - .4 Have clear opening of 135mm.
  - .5 Bonnet on the bottom section which is capable of enclosing the packing gland section of the gate valve.
  - .6 Acceptable products:
    - .1 Mueller MVB composite valve box or approved equivalent.

## 2.8 SERVICE CONNECTIONS

- .1 Service lateral piping shall be minimum 25mm diameter.
- .2 Crosslinked polyethylene (PEXa) municipal tubing for pressure applications: to AWWA C904, ASTM F876 and CSA B137.5. Pipe shall be rated for 1103 kPa at 23°C. Install a stainless-steel support liner inside the pipe at each compression joint and at corporation stop connections.
  - .1 Acceptable products: Rehau – Municipex and Uponor – AquaPex.
- .3 Joints: compression type, minimum pressure rating 1045 kPa.
  - .1 Acceptable product: Mueller 110, H-15403N/H-12940; Cambridge Brass 118NL-H3H3/119NL-H3H3.
- .4 Corporation stop: brass to ASTM B62, compression type, inlet threads to AWWA C800.
  - .1 Acceptable product: Mueller H-15008N up to 25mm and Mueller H-15023N for 38mm to 50mm; Cambridge Brass 302-A3H3.
- .5 Curb stop and drain: brass to ASTM B62, compression type joints and O-ring seal.
  - .1 Acceptable product: Mueller Mark II Oriseal H-15219N; Cambridge Brass 203NL-H3H3.

- .6 Service clamp: bronze body, confined o-ring seal cemented in place, and straps suitable for connecting main. Outlet tapped and threaded to AWWA C800.
- .7 Service box: adjustable type, cast-iron bottom section, cast-iron lid with recessed pentagon nut and internal stem to suit depth of bury. Service box to have appropriate foot piece. Rod material to be 416 stainless steel complete with stainless steel cotter pin.
  - .1 The following service boxes are approved for use for 19mm - 25mm curb stops in the City of Charlottetown:
    - .1 Mueller A726
    - .2 Bibby (equivalent to above)
  - .2 The following service boxes are approved for use for 38mm - 50mm curb stops in the City of Charlottetown:
    - .1 Mueller A728
    - .2 Bibby (equivalent to above)
  - .3 Curb stops larger than 50mm shall be equipped with regular valve boxes as per Clause 2.7.
- .8 Provide bronze service saddle for all service connections; saddles to be double strap type with AWWA taper thread and suitable for PVC, Ductile Iron or HDPE pipe as required.
  - .1 Acceptable product: Mueller.

## 2.9 HYDRANTS

- .1 Supplied as per the City standard.
- .2 Dry barrel type: to AWWA C502 and as follows:
  - .1 Depth of bury: as indicated.
  - .2 Barrel: two piece with safety break-away flange and stem.
  - .3 Main valve: resilient type, 134mm minimum diameter.
  - .4 Inlet connection: mechanical joint, 150mm diameter.
  - .5 Nozzles: two 65mm hose and one 114mm pumper, with threads (5 TPI) to standard City of Charlottetown Thread.
  - .6 Direction to of opening: counter clockwise.
  - .7 Operating nut: .75 inch pentagon.
  - .8 Colour: to standard of Authority having jurisdiction (red body and silver caps).
  - .9 Acceptable products: Brigadier M-67, with brass to brass or brass to bronze seating.

## 2.10 THRUST RESTRAINT

- .1 Thrust blocks shall be cast-in-place concrete with a minimum 28-day compressive strength of 25 MPa and Grade 400 reinforcing steel where indicated.

- .2 Concrete thrust blocks to extend into bottom and sides of trench, and also above the pipe; a minimum of 150mm for all horizontal bends and a minimum of 300mm for vertical bends.

## 2.11 MECHANICAL JOINT RESTRAINT

- .1 Joint restraint system components may be used in lieu of thrust blocks, subject to the written approval from the Owner's Representative. Such approvals shall be based on the Manufacturer's Specifications, Engineer's design notes and detail drawings showing proposed joint restraint systems. Approvals to be obtained prior to installation.
- .2 Restraining devices shall incorporate a series of mechanical serrations on the inside diameter to provide positive restraint, exact fit, 360° contact or wedge type and support of the pipe wall complete with stainless steel bolts and nuts. They shall be corrosion resistant, ductile-iron epoxy coated, with stainless steel tee bolts and nuts.
- .3 Mechanical joint restraint device: (75mm to 400mm) ductile iron follower gland to AWWA C153 and C111 with multiple wedge restraining mechanism, minimum pressure working rating 2410 kPa and minimum safety factor of 2:1. Lugs to have twist-off torque nuts. Acceptable product by EBAA Iron Sales Inc.
- .4 Mechanical Joint restraint for PVC watermain to be, GripRing Pipe Restrainer by Romac, Uni-Flange Series 1500 "Circle Lock" by Ford Meter Box, One-Lok Model SLCE by Sigma, PVC StarGrip Series 4000 by Star, or approved equal.

## 2.12 DISINFECTANT

- .1 Sodium hypochlorite or calcium hypochlorite: to AWWA B300.
- .2 Liquid Chlorine: to AWWA B301.

## 2.13 REDUCING AGENT

- .1 Hydrogen Peroxide, 35% by mass commercial grade.

## 2.14 MARKER TAPE AND TRACER WIRE

- .1 Underground warning tape: minimum 150mm wide, metal detector warning tape, clearly marked "Caution - Buried Water Line", colour blue.
- .2 RW90, number 10 gauge (AWG), single stranded, insulated copper wire with 60 mil of black cross linked polyethylene (XCPE) insulation specifically manufactured for direct burial application or approval equivalent.

## 2.15 MARKERS

- .1 Timber maker stake, 40mm x 90mm painted blue. Must be installed as location marker for end of service at property line.

- .2 Hydrant marker: fabricate from 40mm O.D. polyethylene pipe, with ductile iron anchor plate. Pipe shall be fluorescent orange in colour and have an overall height of 1.8 metres. Standard of acceptance: as manufactured by CKT Investments, Winnipeg, Manitoba.

## 2.16 GRANULAR BEDDING AND BACKFILL

- .1 As specified in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

## 2.17 RIGID INSULATION

- .1 Rigid polystyrene insulation to CAN/CGSB-51.20, type 4, minimum compressive strength 415 kPa (60 psi).
- .1 Acceptable products: HI60 as manufactured by Dow Chemical of Canada, Foamular 600 as manufactured by Celfortec Inc.

## 2.18 GEOTEXTILE FABRIC

- .1 Non-woven geotextile Terrafix 270R or equivalent.

## 2.19 CATHODIC PROTECTION

- .1 All metallic structures associated with new PVC water mains shall be cathodically protected using packaged zinc anodes, unless they are fusion epoxy-coated with stainless steel connectors (complete with anti-galling compound). Any nicks in the protective epoxy-coated shall be repaired in the field with a bituminous coating.

- .1 Sacrificial zinc anodes shall be pre-packaged and made of high grade electrolytic zinc, 99.99% pure and conform in composition to the latest edition of ASTM B418 Type II and shall be composed of the following:

Aluminum	0.005%	maximum
Cadmium	0.003%	maximum
Iron	0.0014%	maximum
Lead	0.003%	maximum
Copper	0.002%	maximum
Zinc	remainder	

- .2 The zinc anode shall be pre-packaged in a cardboard cover containing a low resistivity backfill consisting of:

Hydrated gypsum	77% ± 2%
Bentonite	15% ± 1%
Sodium Sulfate	8% ± 1%

- .3 The backfill shall have a grain size so that 100% is capable of passing through a #20 screen and 50% will be retained by a #1000 screen.

- .4 Anodes shall be kept dry prior to installation. Anodes shall carry a label identifying the manufacturer, the product ID number, the type and net weight of anode, metal and backfill composition.
  - .5 The anode shall be supplied with 3 metres of AWG no 10/7 strand copper cable having RWU-90 white insulation. The cable shall be silver soldered to the steel core, which extends the full length of the anode casting, and shall be moisture sealed with self-amalgamating tape and electrical tape.
  - .6 To guarantee the quality of the high purity zinc, an "Affidavit stating the metallurgical analysis of the anode composition" shall be provided by the supplier, when requested by the Owner's Representative, prior to start of the contract.
- .2 Exothermic Weld Equipment shall be as manufactured by "Cadweld" Erico Products, "Thermoweld" Continental Industries, or approved equal.
  - .3 Anodes shall be connected to copper service pipes either by grounding tail nuts on corporation stops, or by silicone bronze grounding clamps directly on the service pipe. A protective coating shall be installed over the clamp, which shall be composed of a synthetic fabric saturated with a blend of microcrystalline petroleum wax, plasticizer and corrosion inhibitors, meeting the requirements of the latest AWWA Standard C217. (e.g. 102mm wide Tec-Tape by Trenton Corporation)

## 2.20 PROTECTIVE COATING

- .1 All mechanical joints, flanges, nuts and bolts of pipes, valves and fittings shall be protected from corrosion with the use of anti-corrosion petrolatum paste, tape and mastic.
- .2 The Contractor shall transport and store coating materials at temperatures between 5°C and 30°C. The Contractor shall ensure surface to be coated is free of loose coating, rust, soil, and other foreign matter; apply priming paste to areas after surface preparation is complete; apply mastic to irregular surfaces to ensure smooth surfaces and no air pockets; apply tape spirally to areas receiving paste or mastic using a 55% overlap wrapping technique; and wrap protected areas with 200 micron polyethylene sheet prior to backfilling
- .3 Anti-corrosion petrolatum paste, tape and mastic.
  - .1 Acceptable product: Winn & Coales (Denso) Ltd., Trenton or Petro.
  - .2 Apply protective coating in strict conformance with product manufacturer's recommendations.
- .4 Protective sheet: polyethylene sheet 200 microns (8 mil) thick.

## Part 3 - Execution

### 3.1 PREPARATION

- .1 Carefully inspect products for defects and remove defective products from site.
- .2 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.

- .1 Inspect materials for defects to approval of Owner's Representative.
- .2 Remove defective materials from site as directed by Owner's Representative.
- .3 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 sediment and erosion control drawings and requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Trench alignment and depth to approval of Owner's Representative prior to placing bedding material and pipe.

### 3.3 GRANULAR BEDDING

- .1 Dewater excavation, as necessary, to allow placement of granular bedding in the dry.
- .2 Place bedding in unfrozen condition.
- .3 Place minimum thickness of 150mm of approved granular material on bottom of excavation and compact to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .4 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .5 Shape transverse depressions in bedding as required to suit joints.
- .6 Clear stone (drainage Class D material) may be used in wet or freezing conditions only where specified or with the prior approval of the Owner's Representative.

### 3.4 PIPE INSTALLATION

- .1 Terminate building water service at property line opposite point of connection to main.
  - .1 Install coupling necessary for connection to building plumbing.
  - .2 If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.

- 
- .2 Pipe shall be thoroughly inspected in the field before and after laying. Any defective or damaged pipe shall be immediately removed from the site and replaced with new sound material at the Contractor's expense.
  - .3 The installation of all water mains and fittings shall be in accordance with the recommendations of the manufacturer and appropriate AWWA standards unless specified herein.
  - .4 Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and efficient execution of the Work. All pipe and fittings shall be carefully lowered into the trench in such a manner as to prevent damage to them. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
  - .5 Handle and join pipe in accordance with the recommendations of the manufacturer and appropriate AWWA standards unless specified herein.
  - .6 Place appropriately sized and designated swabs into the pipe at as many locations as needed to ensure that every section of water main is swept by a swab when first charging the water main with water.
  - .7 Lay pipes on prepared bed, true to line and grade. The minimum depth of cover shall be 1.8m measured from finished grade to the top of the pipe. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Replace defective pipes. Correct pipes which are not in true alignment or grade. The pipes shall be laid with no reverse grades, humps or sags unless indicated on the Drawings.
  - .8 Face bell ends of pipe in direction of laying. For mains on a grade of 2% or greater, face bell ends up-grade.
  - .9 There shall be no deflection allowed at the joints. The pipe shall not be bent. The pipe shall be laid true to line and grade.
  - .10 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 and block pipes in an approved manner to prevent creep during down time.
  - .11 Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave a smooth end at right angles to axis of pipe.
  - .12 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.
  - .13 Avoid displacing gasket or contaminating gasket with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.
  - .14 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes before laying next length of pipe or as otherwise approved by Owner's Representative.



- .15 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
- .16 Mechanical joint connections and tightening and torquing of bolts shall be in accordance with the manufacturer's instructions and recognized good practice.

### 3.5 CONNECTING TO EXISTING WATER MAINS

- .1 Connect new mains to existing main as indicated.
- .2 Under no circumstances whatsoever shall the Contractor operate existing water main valves or make connections to existing water mains without the prior approval of the City.
  - .1 The Utility does not guarantee leak tight operation of existing valves.
- .3 No work will be performed on existing main until all items required to complete the connection are on site and the outside diameter and type of pipe have been confirmed.
- .4 Do not make a connection to an existing main within 1.0 m of a fitting, pipe joint or another service.
- .5 The Utility will operate valves in the exiting system.
- .6 When a connection is made to an exiting main it shall be completed by Utility personnel with the contractor supplying all material, excavation, shoring, backfilling and miscellaneous equipment for the connection.
- .7 It is the Contractor's responsibility to ensure that their operations do not contaminate the public water supply. If at any time, the water in the existing system becomes contaminated through actions by the Contractor, whether or not due to negligence, the Contractor shall be held financially accountable for any corrective action taken by the City of Charlottetown, as well as for the cost of defending any settlement of all claims resulting from their negligence, including, but not limited to, costs and attorneys' fees.

### 3.6 VALVE BOXES

- .1 Valve boxes shall be set on gate valves as indicated on the Drawings. The valve box shall be set so as not to transmit stress to the valve and shall be accurately centered over the wrench nut of the valve, with the valve box set plumb. Boxes will not be required where valves are in chambers.
- .2 Place frame and cover on top section to elevation indicated. Valve box tops and cover elevation shall be set flush with grade elevation or as is required to permit clear access and protect from damage due to vehicles, snowplows, grass cutting, etc.
- .3 Clean valve boxes of debris and foreign materials; remove fins and sharp projections.

- .4 Should the Contractor encounter a valve box or curb box requiring repair or extension, the box will be excavated and the repair or extension performed using materials and methods conforming to this Section. Upon completion of the repair, the box will be properly adjusted and backfilled in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

### 3.7 HYDRANTS

- .1 Hydrants shall be installed in accordance with AWWA M17 and at the locations as indicated on the Drawings or where directed.
- .2 Install gate valve and cast-iron valve box on hydrant branch as indicated.
- .3 Set hydrants plumb, with hose outlets parallel with edge of pavement or curb line, with pumper connection facing roadway.
- .4 Hydrants are to be supplied such that they are delivered with the correct bury for the location planned for each hydrant. Bury extensions are to be avoided where possible and if required are to be installed by the manufacturer's representative. As much as possible, hydrants shall be set at the appropriate elevation that permits a level approach to the hydrant from the shoulder of the road with the break away flange at the correct elevation as detailed by the manufacturer's recommendations. Prior to ordering fire hydrants elevations are to be obtained to confirm the correct bury for each location.
- .5 Place concrete thrust blocks as indicated. Do not obstruct drain holes.
- .6 Provide drainage not less than 0.5 m<sup>3</sup> in volume and backfill with clear stone to a level 150mm above drain holes from hydrant to main.
- .7 Place geotextile over clear stone from hydrant to main.
- .8 Notify Owner's Representative if water table is above drain holes. Plug drain holes and install permanent identification marker on hydrant.
- .9 Place appropriate sign on installed hydrants indicating whether or not they are in service during construction.

### 3.8 VALVES AND APPURTENANCES

- .1 Install valves and appurtenances where shown on Drawings in accordance with manufacturer's recommendations.
- .2 On direct buried valves, install valve boxes plumb and centered over operating nut, using centering disc, and true to line and grade.
- .3 Valves shall be properly joined to the mains with mechanical joint restraints connections according to the requirements of the manufacturer and recognized good practice. The valves shall be set so the valve stems are vertical and plumb.
- .4 Use thrust anchors for valves greater than 150mm on PVC pipe.

### 3.9 TRACE WIRE

- .1 Install trace wire on all non-ductile iron watermain, hydrant laterals and water services except where such water service pipe is of copper material. Install the wire in such a manner to be able to properly trace all watermain, hydrant laterals and water services without loss or deterioration of signal or without loss or without the transmittal signal migrating off the tracer wire.
- .2 At the point of connection between the cast and ductile iron watermain with any non-iron watermain, connect the tracer wire to the first valve box or as directed by the Owner's Representative.
- .3 Lay trace wire flat and securely affix to the pipe at three (3) metre intervals. Protect the wire from damage during the excavation of the works. No breaks or cuts in the tracer wire insulation will be permitted.
- .4 Except for approval splices in connections, tracer wire must be continuous and without splices from valve box to valve box, valve box to fire hydrant or fire hydrant to fire hydrant.
- .5 Test the tracer wire system for functionality after it has been confirmed and demonstrated that the entire tracer wire system is installed and is functioning properly.

### 3.10 SERVICE CONNECTIONS

- .1 Tapping of water mains shall be with use of proper tools and equipment and according to recognized good practice and in compliance with the pipe manufacturer's specifications unless specified herein.
- .2 Contractor shall make individual contact with property owners and confirm the proposed location of curb stop prior to installation.
- .3 Install services at locations indicated.
- .4 Do not tap closer than 1000mm to adjacent service or pipe joint. Tap water main and install corporation stops at 2:00 o'clock or 10:00 o'clock positions using type of connection and tapping method appropriate for type, size and pressure of water main. A goose neck shall be provided in all service lateral piping, near the water main and laid on the horizontal.
- .5 New water service laterals shall be one continuous length of water service pipe from corporation stop to curb stop.
- .6 Follow manufacturer's instructions including installing to recommended torque. Check torque for each installation.
- .7 Lay service pipe from water main to curb stop in evenly graded trench with bedding as indicated.
- .8 Install curb stop at street line, or where indicated. Ensure that curb stop is properly oriented.
- .9 Leave corporation stop fully open. Operate curb stop to ensure flow, then close curb stop and leave closed.

- .10 Install service box over curb stop, set plumb, with top flush with finished grade.
- .11 Place temporary marker stake at end of each service lateral, extending from pipe end at pipe level to 600mm above grade. Paint exposed portion of stake BLUE with designation WATER in black.

### 3.11 MARKER TAPE

- .1 Place marker tape in trench to 450mm below top of finished grade.

### 3.12 PIPE RESTRAINT FOR VERTICAL BENDS

- .1 Where vertical bends are required and a thrust block is not specified, the Contractor shall restrain the fitting and the bell and spigot joints as required. It shall be the Contractor's responsibility to determine the total length of pipe restraint by an approved pipe thrust restraint program or method. The length of restraint shall be submitted to the Owner's Representative for approval in advance of installation. Mechanical joint pipe restraints shall be installed in accordance with the manufacturer's recommendations.

### 3.13 THRUST BLOCKS

- .1 Except where dimensioned on Drawings, dimensions of thrust blocks to be determined by Owner's Representative when receiving surfaces are ready for inspection.
- .2 Place concrete thrust blocks between valves, plugs, caps, bends, reducers and fittings to solid undisturbed ground or as directed by Owner's Representative.
- .3 In placing concrete, take care not to disturb pipe alignment around or adjacent to the work. Keep joints and couplings free of concrete. Provide polyethylene sheet bond breaker between valve/fitting and concrete.
- .4 Do not backfill directly over concrete within 24 hours after placing.
- .5 For restrained joints: only use restrained joints approved by Owner's Representative.

### 3.14 INSULATION

- .1 Install rigid insulation boards over water main where indicated. Do not disturb or break insulation boards during backfilling.

### 3.15 CATHODIC PROTECTION

- .1 Anodes shall be installed using exothermic welding "Cadweld" tools and products, or by wrapping around bolts and securing with a second nut, as per the following:
  - .1 Cast iron and plain ductile iron fittings 200mm diameter and smaller: one (1) packaged 5.5 kg zinc anode on each structure. All larger diameter fittings require 11 kg zinc anodes.

- .2 Hydrants: One (1) packaged 11 kg zinc anode shall be installed on each hydrant boot if stainless steel tee bolts and nuts (complete with anti-galling compound) are not used.
  - .3 Copper services (all sizes): One (1) 11 kg zinc anode at each curb stop. Copper services longer than 20m in length shall receive one additional anode for each 20m of additional length or fraction thereof. Protective coating shall be applied with 25mm minimum overlap in accordance with manufacturers' suggested application procedures.
  - .4 When replacing a water main, one (1) packaged 11 kg zinc anode shall be installed on all exposed copper services.
- .2 All thermite welds shall be made utilizing copper wire sleeves and individual components shall not be interchanged between different manufacturers. Weld material shall be equal to that specified for "Cadweld" equipment. Coating materials shall be removed from the surface over an area just sufficient to make the connection (70mm X 70mm standard). The steel surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. Surface must be shiny-clean and dry. Resin-impregnated grinding wheels will not be allowed.
- .1 A 22-ounce hammer shall be used by the Contractor for testing adherence by striking a blow to the weld. Care shall be taken to avoid hitting the wires.
  - .2 All exposed metal at thermite weld locations shall be protected using bituminous coating, and shall be TC Mastic as manufactured by Tapecoat Company, Bitumastic 50, as manufactured by Koppers Company, Inc., A-51 by Royston Roskote, or approved equal. Spray-on mastic will not be accepted.
  - .3 When using the "double nut" method, the copper wire is to be wrapped several times around the bolt and secured with the second nut and then wrapped with neoprene tape. The bolt must be scraped down to bare metal prior to wrapping the wire.
- .3 All non stainless-steel bolts used for connections of couplings, when not attached to a water main fitting, shall be corrosion-protected with zinc anode caps installed alternately on every other bolt. (e.g. when joining a PVC repair pipe section to an existing ductile or cast iron water main pipe). Alternately, all couplings (gland packs) connected to one fitting (e.g. Tee) may be protected with one (1) zinc anode attached to each coupling.
- .4 Anode shall be installed in the trench a minimum of 500mm horizontally and a minimum of 300mm below the fitting or structure that it is protecting. Wires shall be laid straight and without kinks. The bottom of the trench shall be free from stones or other materials, which might injure the insulation or the conductors. Anodes shall not be handled by their lead wires as this can damage the anodes internal wire connection.
- .5 When placing the backfill, care shall be taken so that the anode is not disturbed and that the thermite weld is not subject to strain.
- .6 Excavate a hole to a minimum of 75mm larger than the diameter of the anode, and to a depth of 300mm below the fittings to be protected.

### 3.16 PROTECTIVE COATING

- .1 Application of Protective Coatings shall be in accordance with product manufacturer's instructions and AWWA C105.

### 3.17 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place approved backfill material in uniform 150mm layers to full width, alternately on each side of pipe, so as not to displace it laterally or vertically, up to grades as indicated.
- .3 Compact each layer to a minimum of 95% of the maximum dry density in accordance with ASTM D698, taking special care to obtain required density under haunches.

### 3.18 COMMISSIONING PLAN

- .1 The Contractor shall provide a Water System Commissioning Plan outlining the measures that will be taken for the hydrostatic testing, chlorination and disinfection of the water system. This plan is to indicate the areas to be tested, the sequence of testing and the sample locations for bacteriological tests. This plan shall follow all requirements set forth in this specification and be provided to and approved by the Owner's Representative prior to any testing taking place.
  - .1 Unless otherwise approved, the maximum length of watermain that can be tested shall be limited to 400m.

### 3.19 LEAKAGE TESTING GENERAL

- .1 Provide labour, equipment and materials required to perform hydrostatic and leakage tests. Tests are to be conducted in accordance with AWWA C600.
- .2 A completed form "WATER MAIN LEAKAGE TEST AND DISINFECTING FORMULAS" (City Standard Forms) signed by the Owner's Representative and the Contractor must be filled out and forwarded to the appropriate people as identified on the form. The Certificate of Substantial Performance of the Work will not be signed and forwarded until the Owner's Representative has received the completed form.
- .3 The operation of any existing valve not part of the new construction and any new valve that isolates the new system from the existing system, shall be by Charlottetown Water and Sewer Corporation staff. Twenty-four hours notice is required by the Charlottetown Water and Sewer Corporation staff for all filling, flushing or chlorination operations for new construction.
- .4 All services, hydrants, mains, and other appurtenances shall be included in the system test.
- .5 Perform tests in presence of the Owner's Representative.
- .6 All valves must be pressure tested, including hydrant valves.
- .7 Where hydrant extensions are required, install extensions prior to testing.

- .8 Open all valves in test section.
- .9 Expel air from main by slowly filling with potable water. Install corporation stops at high points where no air-vacuum release valves are installed. After testing, remove corporation stops and install plugs.
- .10 Ensure all air release valves on section being tested are installed and operational before testing. Fill the watermain, 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.

### 3.20 TESTING OF PVC MAINS

- .1 Gradually increase water pressure inside pipe until it reaches 1035 kPa at the lowest location under test. Maintain pressure test for two hours.
- .2 Measured leakage of water as measured by a water meter approved by the Owner's Representative.

$$Q = \frac{LD\sqrt{P}}{795,000}$$

where Q = allowable leakage in litres per hour;  
L = length of pipe tested, in meters (m);  
D = nominal diameter of pipe in millimetres (mm);  
P = test pressure in kilopascals (kPa).

- .3 The allowable leakage shall not be exceeded between adjacent valves.
- .4 If length of test section exceeds 400m, allowable leakage must not exceed allowable leakage for 400m. All valves must be pressure tested, including hydrant valves.

### 3.21 TESTS TO BE REPEATED

- .1 Should tests disclose leakage, locate and repair defective pipes, or joints, to approval of Owner's Representative.
- .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's Representative suspect the water main, for any reason, no longer complies with requirement of the test, he may order a second test and should the length of pipeline prove defective, Contractor shall repair or make good defect at his own expense.

### 3.22 FLUSHING AND DISINFECTION

- .1 Prior to the flushing of pipelines, provide protection to the ground where the initial point of contact occurred at the flushed water using a rock landing pad and/or other non-erodible material. The flow of the water from flushing and testing shall be directed onto an area that is well vegetated in order to prevent erosion / sedimentation.
- .2 Prior to commencing work, the Contractor must prepare a plan complete with details of how to manage the testing and flushing water from the piping network. Submit plan for review and approval by Utility, Department of Environment and Authorities Having Jurisdiction.
- .3 Chlorination of any water system can proceed only after system has been successfully pressure tested. The chlorination test is to be witnessed by the Owner's Representative.
- .4 Flush and disinfect watermains and services to AWWA C651 and as specified. Notify Owner's Representative 24 hours in advance of flushing and disinfection.
- .5 Flush watermains and services with potable water through available outlets with sufficient flow to produce maximum velocity in watermain of 1.5 m/s for minimum 10 minutes. Flush until foreign materials have been removed and water is clear.
- .6 Fire hydrants shall not be used for the collection of water samples for verification of acceptable water quality. The Contractor must install temporary copper sampling services for water quality sample collection in accordance with the AWWA Standards.
- .7 Slowly open and close valves and hydrants to ensure thorough flushing.
- .8 If satisfactory results cannot be achieved by flushing, swab pipes by approved methods and re-flush.
- .9 Disinfect watermain and services upon completion of flushing using chlorine solution distributed throughout entire system.
- .10 Inject 1% chlorine solution through a corporation cock in the top of newly laid pipe, at point close to where main is being filled and at rate proportional to filling rate. Prepare stock chlorine with concentration of 1% free chlorine by volume as follows:

Product	Amount of Compound	Quantity of Water
High test Calcium Hypochlorite (67-70% Cl)	1.0 kg	60 litres
Liquid Bleach (5.25% Cl)	1.0 litres	3.5 litres
(10.5% Cl)	1.0 litres	7.0 litres



- .11 Calcium hypochlorite shall not to be used when water temperature is less than 5°C.
- .12 The following table indicates the quantity of 1% chlorine stock solution required per 100 metre length of pipe.

Pipe Diameter (mm)	1% Chlorine Stock Solution (litres)
100	5
150	11
200	19
250	30
300	43
350	58
400	76

- .13 Operate valves, hydrants and appurtenances while main contains chlorine solution.
- .14 Take water samples at all hydrants and termination points, in suitable sequence, to test chlorine residual. When tests indicate minimum chlorine residual of 50 mg/l, leave system charged with disinfectant solution for 24 hours. At the end of this 24-hour period, the treated water in all portions of the main shall have a residual of not less than 25 mg/l. If the residual has fallen below 25 mg/l, the system shall be re-chlorinated.
- .15 Flush disinfectant solution from line after 24 hours. Under no circumstances shall disinfectant solution remain in the line longer than 48 hours. Add 1.0% Hydrogen Peroxide reducing agent to the disinfectant solution at point of discharge or within a retention facility such that the solution is disposed to the environment with a total chlorine residual no greater than 0.02 mg/l. Check chlorine residuals before disposal and at regular intervals during disposal to ensure compliance. This de-chlorination requirement can only be excluded with the written consent of the PEI Department of Environment, Energy and Climate Change.
- .16 Dispose of dechlorinated disinfectant solution. Where disposing to the environment, disposal of the dechlorinated solution must be at least 100 metres from the nearest watercourse.
- .17 Where disinfectant solution is dechlorinated at point of discharge, inject stock reducing agent at a rate proportional to discharge rate. Injection and discharge rates must be monitored continuously to ensure proper proportioning.

- .18 Prepare stock reducing agent by volume with concentration of 1% Hydrogen Peroxide ( $H_2O_2$ ) by mass, as follows:

Liquid Reducing Agent	Amount of Agent (litres)	Quantity of Water (litres)
Hydrogen Peroxide (35% $H_2O_2$ by mass)	1.0	34

- .19 The following table indicates quantity of 1% Hydrogen Peroxide required to reduce total chlorine residual of disinfectant solution contained per 100 metre length of pipe, from 50 mg/l to 0.02 mg/l.

Pipe Diameter (mm)	1% Hydrogen Peroxide Stock Solution (litres)
100	5
150	10
200	18
250	28
300	41
350	55
400	72

- .20 Where total chlorine residual of disinfectant solution exceeds 50 mg/l, quantity of stock reducing agent for de-chlorination can be increased in direction proportion to the quantity indicated in the above table.
- .21 After disinfectant solution is flushed from water main, assist Owner's Representative in obtaining two water samples on each of two consecutive days (at least 24 hours apart) for bacteriological tests. Hydrants shall not be used as sampling points. Repeat disinfection procedure if bacteriological tests fail.
- .22 Bacteriological samples are to be obtained from a test sampling tap or a copper service lateral if available. Sampling shall take place from every 366m of new water main, plus one set from the end of the line and from every branch (see AWWA C651-99, Section 5.1). Coliform tests must indicate 0 on two consecutive days combined with background count of less than 150.
- .23 Should any of the test results be positive, repeat disinfection, flushing, sampling and analysis.

- .24 After testing and submission of the written results for the passing of the bacteriological tests, remove corporation stops and install plugs. Check visually for leakage after plugs are installed with water main under normal operating pressure.
- .25 After bacteriological tests pass, place watermain in service as directed.
- .26 Bacteriological tests must pass before Substantial Completion of the work will be issued.

### 3.23 **HYDRANT FLOW TESTS**

- .1 Conduct flow tests on every hydrant to determine fire flows prior to painting hydrant caps and ports.

### 3.24 **PAINTING OF HYDRANTS**

- .1 After installation, paint hydrants in accordance with City requirements.
- .2 After hydrant flow tests, paint caps and ports to meet colour selections approved by authority having jurisdiction.

### 3.25 **CLEAN-UP**

- .1 Upon completion of testing each section, remove ancillary equipment and plug holes in a manner approved by Owner's Representative.

**END OF SECTION**

## Part 1 - General

### 1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 32 11 23 – Granular Surface

### 1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C14M, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
  - .2 ASTM C76M, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).
  - .3 ASTM C443M, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .4 ASTM C1433, Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers.
  - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .6 ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .7 ASTM F794, Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A3000, Cementitious Materials Compendium.
  - .2 CSA A257 Series, Standards for Concrete Pipe and Manhole Sections.
  - .3 CSA B1800, Thermoplastic Nonpressure Piping Compendium.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
  - .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
  - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
  - .3 Notify Owner's Representative in writing 72 hours minimum in advance of any interruption in service.

#### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings, manufacturer's test data and certification that materials meet requirements of this Section at least 2 weeks prior to commencing work.
- .3 Certification to be marked on pipe.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Contractor to deliver, store and handle materials in accordance with Product Requirements or PEI TIR requirements.

### Part 2 - Products

#### 2.1 PVC PIPE

- .1 PVC (Polyvinyl Chloride) pipe: to ASTM D3034 and CSA B1800.
  - .1 Minimum sanitary sewer main diameter: 200mm.
  - .2 Standard Dimensional Ratio (SDR): 35
  - .3 Locked-in gasket and integral bell system. Rubber gaskets to CAN/CSA A257.3.
  - .4 Colour coded GREEN.
- .2 Large diameter, ribbed PVC sewer pipe and fittings: to ASTM F794 and CSA-B1800.
- .3 Bends to be of the long radius type only.

#### 2.2 CONCRETE PIPE

- .1 Reinforced circular concrete pipe and fittings: ASTM C76 and CSA A257.2.
  - .1 Class: 65D or (ASTM Class III), 100D or (ASTM Class IV), 140D or (ASTM Class V) as indicated on the Drawings.
- .2 Locked-in gasket and integral bell system with flexible rubber gasket joints to CSA A257.3.
- .3 Lifting holes:
  - .1 Pipe 900 mm and less diameter: no lift holes.
  - .2 Pipe greater than 900 mm diameter: lift holes not to exceed two per pipe.
  - .3 Provide prefabricated plugs to effectively seal lift holes after installation of pipe.

#### 2.3 ACCEPTABLE PRODUCT WHEN APPROVED BY OWNER'S REPRESENTATIVE

- .1 **Dual wall corrugated PVC (Polyvinyl Chloride) pipe:** to ASTM F794 and CSA B1800.
  - .1 Minimum sanitary sewer pipe diameter: 200mm.

- .2 Locked in gasket and integral bell system with internal hydrostatic pressure of at least 100kPa.
- .3 Colour coded GREEN.
- .2 **Profile wall PVC (Polyvinyl Chloride) pipe:** to ASTM F794 and CSA B1800.
  - .1 Minimum sanitary sewer pipe diameter: 200mm.
  - .2 Locked in gasket and integral bell system with internal hydrostatic pressure of at least 100kPa.
  - .3 Colour coded GREEN.

## 2.4 **SANITARY SERVICE LATERALS**

- .1 PVC (Polyvinyl Chloride) pipe: to ASTM D3034 and CSA B1800.
  - .1 Minimum sanitary sewer service lateral diameter: 100mm.
  - .2 Standard Dimensional Ratio (SDR): 35
  - .3 Locked-in gasket and integral bell system. Rubber gaskets to CSA A257.3.
  - .4 Colour coded GREEN.
- .2 Tee connections and fittings to the PVC sanitary main to be PVC pipe DR35 to ASTM D3034 and CSA B1800 complete with integral gaskets.
- .3 Saddles shall be PVC gasketed and strap on type of the size as indicated on the Drawings, meeting the same requirements as the sanitary service pipe or Rubber "Inserta-tee" or "Quick Seal type connectors.
- .4 Bends shall be of the long radius type only.
- .5 Caps for ends of laterals shall be PVC.

## 2.5 **GRANULAR BEDDING AND BACKFILL**

- .1 As specified in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

## **Part 3 - Execution**

### 3.1 **PREPARATION**

- .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 sediment and erosion control drawings and requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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

### 3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer.
- .3 Trench alignment and depth to approval of Owner's Representative prior to placing bedding material and pipe.

### 3.3 GRANULAR BEDDING

- .1 Dewater excavation, as necessary, to allow placement of granular bedding in the dry.
- .2 Place bedding in unfrozen condition.
- .3 Place minimum thickness of 150 mm of approved granular material on bottom of excavation and compact to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .4 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipes.
- .5 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with bedding material.

### 3.4 INSTALLATION

- .1 Pipe shall be thoroughly inspected in the field before and after laying. Any defective or damaged pipe shall be immediately removed from the site and replaced with new sound material at the Contractor's expense.
- .2 Approved laser alignment equipment must be used to control line and grade during all pipe laying.
- .3 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Owner's Representative.
- .4 Handle pipe using methods in accordance with manufacturer's recommendations.
  - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .5 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
  - .1 Ensure barrel of each pipe is in contact with shaped bed and with uniform bearing throughout its full length.

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- .2 The Owner's Representative will be the sole judge of the deviation and the required corrective work. Any pipe which is not in true alignment or shows any undue settlement after laying shall be taken out and re-laid at the Contractors expense.
  - .6 Commence laying at outlet and proceed in upstream direction with bell ends of pipe facing upgrade.
  - .7 Trenches where pipe laying is in progress shall be kept dry and no pipe shall be laid in water or upon a wet bedding. As the pipes are laid, they must be thoroughly cleaned and the bore protected from dirt and water. No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place to prevent any movement or disturbance of the pipe.
  - .8 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .9 Do not allow water to flow through pipe during construction, except as may be permitted by Owner's Representative.
  - .10 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
  - .11 Install PVC pipe and fittings in accordance with CSA B1800.
  - .12 Joints:
    - .1 Install gaskets as recommended by manufacturer if not pre-installed.
    - .2 Support pipes with bedding as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
    - .3 Align pipes carefully before joining.
    - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
    - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gasket; clean, lubricate and replace gasket before joining is attempted.
    - .6 Complete each joint before laying next length of pipe.
    - .7 Minimize joint deflection after joint has been made to avoid joint damage.
    - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
  - .13 Block pipes when any stoppage of work occurs to prevent "creep" during down time.
  - .14 Cut pipes only as required for special inserts, fittings or closure pieces in neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave spigot end at right angles to axis of pipe.
  - .15 Make watertight connections to manholes. Manholes shall have factory installed cast-in rubber gaskets to suit the pipes. Any additional holes required in the field shall be core-drilled and a "Kor-n-seal" connector inserted. Use non-shrink grout when suitable gaskets are not available.



### 3.5 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place approved backfill material in uniform 150mm layers to full width, alternately on each side of pipe, so as not to displace it laterally or vertically, up to grades as indicated.
- .3 Compact each layer to a minimum of 95% of the maximum dry density in accordance with ASTM D698, taking special care to obtain required density under haunches.

### 3.6 SANITARY SERVICE LATERALS

- .1 Install pipe to manufacturer's standard instructions and specifications and as indicated on the Drawings.
- .2 Maintain pipe grade at 2% minimum unless directed otherwise by Owner's Representative.
- .3 Sanitary service lateral connections to sanitary sewer main: approved Tee fittings or approved saddles.
- .4 Sanitary service lateral connection pipe shall not to extend into interior of sanitary sewer main.
- .5 Make up required horizontal and vertical bends from 45° long radius bends or less.
- .6 Plug sanitary service laterals with watertight caps or plugs unless service is presently active. If active make connection to existing sanitary sewer lateral.
- .7 Place location marker at ends of plugged or capped unconnected sanitary service laterals. Each marker shall consist of 50 x 100 mm stake extending from pipe invert to 0.6 m above final finished landscape grade. Paint exposed portion of stake red with designation SAN SWR in black. The sanitary sewer lateral marker shall include a written measured depth from a line drawn on the marker to the pipe elevation.

### 3.7 PIPE CLEANING

- .1 Prior to testing, remove foreign material from sewers and related appurtenances by flushing with water.

### 3.8 FIELD TESTING SANITARY GRAVITY SEWER

- .1 Perform air testing as soon as practicable after pipe line section is complete, and service connections have been installed.
- .2 Perform tests in presence of Owner's Representative. Notify Owner's Representative 24 hrs in advance of proposed tests.
- .3 Carry out tests on each section of sewer between successive manholes including service connections.
- .4 Tests for PVC sanitary sewers:

- .1 All PVC sanitary sewers including services shall be tested for watertightness by an air test after backfilling.
  - .2 Carry out tests on each section of sewer between successive manholes including service connections.
  - .3 The test section shall be plugged at each end with one of the plugs equipped for the air inlet. All services, stubs and fittings into the sewer test section shall be properly capped or plugged and braced to prevent leakage.
  - .4 The air control equipment shall consist of valves and pressure gauges used to control the air entry rate and to monitor the air pressure. The air control equipment shall include a shut-off valve, pressure regulating valve, pressure reduction valve and a monitoring pressure gauge having minimum divisions of 69 kPa and accuracy of 0.28 kPa.
  - .5 Air shall be supplied to the test section slowly, filling the pipe until a constant pressure of 24 kPa is maintained. The air pressure must be regulated to prevent the pressure inside the pipe from exceeding 34 kPa.
  - .6 When constant pressure of 24 kPa is reached, throttle the air supply to maintain the internal pressure above 21 kPa for a minimum of 5 minutes to permit the temperature of the entering air to equalize with the pipe wall temperature. Check for leakage with a soap solution. If leakage is evident, release the pressure in the line, tighten leaky caps and plugs and repressurize as before.
  - .7 After a stabilization period, adjust the air pressure to 24 kPa and shut off the air supply. Observe the gauge until the air pressure reaches 20.5 kPa, then commence timing with a stop watch until the pressure drops to 17 kPa. The time required for this pressure loss of 3.5 kPa is outlined in the Uni-bell Handbook of PVC Pipe Design and Construction, 2012 - Table 12.7.
- .5 Elevation and location:
- .1 Provide Owner's Representative with a high powered battery operated lamp for visual examination of all sewers. The lamp will be shone through the sewer from manhole to manhole. At least half diameter of the end of the pipe at the light source at one manhole shall be visible from the other manholes when viewed from either direction. Also, the viewing is to observe any standing water.
  - .6 The Contractor shall be responsible to ensure that the "SANITARY SEWER – PIPE LEAKAGE TEST" form (City standard Forms) has been completed and submitted to the Owner's Representative.

### 3.9 DEFLECTION TESTING - PVC PIPE

- .1 Measure deflection by pulling a deflection gauge through each pipe from manhole to manhole after backfilling.
- .2 Provide deflection gauges to measure a 5% and 7.5% deflection. Gauges to be a "Go-No-Go" device.

- .3 Thirty days after installation, pull a deflection gauge measuring 5% deflection through the installed section of pipeline. If this test fails, proceed with 7.5% deflection test.
- .4 Thirty days prior to completion of Warranty Period Maintenance, pull a deflection gauge measuring 7.5% deflection through the installed section of pipeline.
- .5 If 7.5% deflection test fails, locate defect and repair. Retest to satisfaction of Owner's Representative.

### 3.10 CLOSED CIRCUIT TELEVISION INSPECTIONS

- .1 Contractor shall arrange and pay for television camera inspection of installed sanitary pipeline, 200mm and larger.
- .2 Notify Owner's Representative 24 hours in advance of inspection.
- .3 Scheduling:
  - .1 The video inspection shall be first performed when the sanitary sewer has been cleaned and all manhole adjustments and street reinstatement have been completed.
  - .2 Repeat video inspection of the sanitary sewer system, after all repairs have been made (at the discretion of the Owner's Representative). Notify Owner's Representative 24 hours in advance of inspection.
  - .3 The entire system shall also be video inspected a second time eleven months after substantial completion.
- .4 Equipment:
  - .1 Provide equipment meeting following requirements:
    - .1 Self-contained monitoring unit and camera with remotely controlled lighting system capable of varying the illumination.
    - .2 Picture quality shall produce continuous 600-line resolution picture, showing entire periphery of pipe.
    - .3 A meter device with readings above ground or marking on cable to clearly identify exact location of camera.
- .5 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.
- .6 Inspection:
  - .1 Perform inspection of pipe by passing TV camera through pipeline in direction of flow.

.7 Records:

- .1 Maintain inspection record in log form, during television inspection.
- .2 Log to include location of each fault.
- .3 Photograph fault from the television screen using a digital camera or provide hard copy stills directly from system if possible. All photographs to be clear and precise with distinct definition of fault.
- .4 Include detailed technical description with photographs as supporting data for each fault.
- .5 All photos and videos to be in colour.

.8 Reports:

- .1 Provide a composite report of TV inspection. Enclose report in binder on letter size paper. Include following pages and information:
  - .1 Title page identifying project, camera operator and dates of inspection.
  - .2 Index page identifying pipeline, page number or numbers where information for section is contained.
- .2 Report on each pipeline to contain:
  - .1 Heading:
    - .1 Street name.
    - .2 Manhole numbers applicable to section.
    - .3 Reference drawing number, if applicable.
    - .4 Weather on the day of inspection.
    - .5 Statement of soil condition in area of inspection, i.e., dry, damp, wet, frozen.
    - .6 Date of inspection.
  - .2 Key Plan showing magnetic north, horizontal distance, pipe and material and direction of flow.
  - .3 Inspection findings for each pipeline to include:
    - .1 Location of all faults.
    - .2 One photograph each of typical joint and flanged connection.
  - .4 Mount photographs on left-hand page and place corresponding description on right- hand page. Number all photographs in order. Number beside photograph to correspond with description number.
  - .5 Enclose all pages of report in transparent sheet protector.
  - .6 Provide copy of video inspection to Owner's Representative.

- .9 Defective sewers identified during video inspection:
  - .1 Sanitary sewers shall be inspected for alignment and obstruction. WATER PONDING IN GRAVITY SEWERS that can not be eliminated by flushing and cleaning will be considered as evidence of pipe settlement. Any and all defects such as water ponding, exposed gasket, 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 City. The initial video inspection shall be at the cost of the Contractor and any costs for re-video of sewer mains required to inspect repaired defects will also be at the Contractor's expense.

### 3.11 TESTS TO BE REPEATED

- .1 Should testing or inspection disclose non-conformance, locate and repair defective pipe or joint to the approval of the Owner's Representative.
- .2 Re-test to determine success or otherwise of remedial measures applied to pipework. These re-tests are to be repeated at no extra cost to Contract until results show that remedial measures have been successful.
- .3 In the event the Owner's Representative suspects the sanitary gravity sewer no longer complies with requirement of the test, the Owner's Representative may order additional testing. 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 additional testing to be at no extra cost to Contract if test proves a defect. However, if this testing shows pipe to be satisfactory, cost of second test will be borne by Owner's Representative.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 32 11 23 – Granular Surface

### **1.2 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C14M, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
  - .2 ASTM C76M, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).
  - .3 ASTM C443M, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .4 ASTM C1433, Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers.
  - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .6 ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .7 ASTM F794, Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A3000, Cementitious Materials Compendium.
  - .2 CSA A257 Series, Standards for Concrete Pipe and Manhole Sections.
  - .3 CSA B1800, Thermoplastic Nonpressure Piping Compendium.
- .3 PEI Department of Transportation and Infrastructure (PEI TIR)
  - .1 General Provisions and Contract Specifications for Highway Construction.

### **1.3 SCHEDULING**

- .1 Schedule Work to minimize interruptions to existing services and to maintain existing flow during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Submit shop drawings, manufacturer's test data and certification that materials meet requirements of this Section at least 2 weeks prior to commencing work.
- .3 Certification to be marked on pipe.

## 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Contractor to deliver, store and handle materials in accordance with Product Requirements or PEI TIR requirements.

## Part 2 - Products

### 2.1 CONCRETE PIPE

- .1 Reinforced circular concrete pipe and fittings: ASTM C76 and CSA A257.2.
  - .1 Minimum storm sewer main diameter: 300mm.
  - .2 Class: 65D or (ASTM Class III), 100D or (ASTM Class IV), 140D or (ASTM Class V) as indicated on the Drawings.
- .2 Locked-in gasket and integral bell system with flexible rubber gasket joints to CSA A257.3.
- .3 Lifting holes:
  - .1 Pipe 900 mm and less diameter: no lift holes.
  - .2 Pipe greater than 900 mm diameter: lift holes not to exceed two per pipe.
  - .3 Provide prefabricated plugs to effectively seal lift holes after installation of pipe.

### 2.2 PVC PIPE

- .1 PVC (Polyvinyl Chloride) pipe: to ASTM D3034 and CSA B1800.
  - .1 Minimum storm sewer main diameter: 300mm.
  - .2 Standard Dimensional Ratio (SDR): 35
  - .3 Standard Dimensional Ratio (SDR) for catch basin leads: 28
  - .4 Locked-in gasket and integral bell system. Rubber gaskets to CAN/CSA A257.3.
- .2 Large diameter, ribbed PVC sewer pipe and fittings: to ASTM F794 and CSA-B1800.
- .3 Bends to be of the long radius type only, color-coded white.

### 2.3 HDPE PIPE

- .1 Double walled HDPE pipe with smooth walled interior and corrugated exterior to 320 kPa to CSA B182.6.
  - .1 Locked-in flexible rubber gasket and integral bell and spigot system.
- .2 Connect to catchbasins with PVC manhole adaptor.

- .3 Acceptable products: Solflo Max by Soleno, Boss 2000 by Armttec and N-12 ST by ADS.

## 2.4 PLUGS AND CAPS

- .1 Plugs and caps for concrete pipes shall be an approved concrete plug or cap complete with rubber gasket seal and shall meet the requirements in Clause 2.1.
- .2 Plugs and caps for PVC shall be an approved PVC plug or cap complete with gasket seal and shall meet the requirements in Clause 2.2.
- .3 Plugs and caps for HDPE pipes shall be an approved HDPE plug or cap complete with rubber gasket seal and shall meet the requirements in Clause 2.3.

## 2.5 STORM SERVICE LATERALS

- .1 PVC (Polyvinyl Chloride) pipe: to ASTM D3034 or and CSA B1800.
  - .1 Standard Dimensional Ratio (SDR): 28
  - .2 Locked-in flexible rubber gasket and integral bell and spigot system.
  - .3 Colour coded WHITE.
- .2 Use approved tee connections and fittings only. Bends shall be of the long radius type only.
- .3 Storm service saddles: with oil resistant gaskets, stainless steel clamp and oil resistant "O" rings in branch end may be utilized upon authorization of the Owner's Representative.

## 2.6 GRANULAR BEDDING AND BACKFILL

- .1 As specified in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

## Part 3 - Execution

### 3.1 PREPARATION

- .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 sediment and erosion control drawings and requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Clean pipes and fittings of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.



### 3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer.
- .3 Trench alignment and depth to approval of Owner's Representative prior to placing bedding material and pipe.

### 3.3 GRANULAR BEDDING

- .1 Dewater excavation, as necessary, to allow placement of granular bedding in the dry.
- .2 Place bedding in unfrozen condition.
- .3 Place minimum thickness of 150 mm of approved granular material on bottom of excavation and compact to a minimum of 95% of the maximum dry density in accordance with ASTM D698.
- .4 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipes.
- .5 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with bedding material.

### 3.4 INSTALLATION

- .1 Pipe shall be thoroughly inspected in the field before and after laying. Any defective or damaged pipe shall be immediately removed from the site and replaced with new sound material at the Contractor's expense.
- .2 Approved laser alignment equipment must be used to control line and grade during all pipe laying.
- .3 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Owner's Representative.
- .4 Handle pipe using methods in accordance with manufacturer's recommendations.
  - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .5 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
  - .1 Ensure barrel of each pipe is in contact with shaped bed and with uniform bearing throughout its full length.
  - .2 The Owner's Representative will be the sole judge of the deviation and the required corrective work. Any pipe which is not in true alignment or shows any undue settlement after laying shall be taken out and re-laid at the Contractors expense.

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- .6 Commence laying at outlet and proceed in upstream direction with bell ends of pipe facing upgrade.
  - .7 Trenches where pipe laying is in progress shall be kept dry and no pipe shall be laid in water or upon a wet bedding. As the pipes are laid, they must be thoroughly cleaned and the bore protected from dirt and water. No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place so as to prevent any movement or disturbance of the pipe.
  - .8 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .9 Do not allow water to flow through pipe during construction, except as may be permitted by Owner's Representative.
  - .10 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
  - .11 Install PVC pipe and fittings in accordance with CSA B1800.
  - .12 Joints:
    - .1 Install gaskets as recommended by manufacturer if not pre-installed.
    - .2 Support pipes with bedding as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
    - .3 Align pipes carefully before joining.
    - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
    - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gasket; clean, lubricate and replace gasket before joining is attempted.
    - .6 Complete each joint before laying next length of pipe.
    - .7 Minimize joint deflection after joint has been made to avoid joint damage.
    - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
  - .13 Block pipes when any stoppage of work occurs to prevent "creep" during down time.
  - .14 Plug lifting holes with approved prefabricated plugs, set in non-shrink grout.
  - .15 Cut pipes only as required for special inserts, fittings or closure pieces in neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave spigot end at right angles to axis of pipe.
  - .16 Make watertight connections to manholes, sluice boxes and catch basins. Manholes and catch basins shall have factory installed cast-in rubber gaskets to suit the pipes. Any additional holes required in the field shall be core-drilled and a "Kor-n-seal" connector inserted. Use non-shrink grout when suitable gaskets are not available.
  - .17 Use prefabricated saddles for connecting pipes to existing storm sewer pipes. Joint to be structurally sound and watertight.
  - .18 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

### 3.5 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place approved backfill material in uniform 150mm layers to full width, alternately on each side of pipe, so as not to displace it laterally or vertically, up to grades as indicated.
- .3 Compact each layer to a minimum of 95% of the maximum dry density in accordance with ASTM D698, taking special care to obtain required density under haunches.

### 3.6 STORM SERVICE LATERALS

- .1 Install pipe to manufacturer's standard instructions and specifications and as indicated on the Drawings.
- .2 Maintain pipe grade at 2% minimum unless directed otherwise by Owner's Representative.
- .3 Storm service lateral connections to storm sewer main: approved Tee fittings or approved saddles.
- .4 Storm service lateral connection pipe shall not extend into interior of storm sewer main.
- .5 Make up required horizontal and vertical bends from 45° long radius bends or less.
- .6 Plug storm service laterals with watertight caps or plugs unless service is presently active. If active make connection to existing storm sewer lateral.
- .7 Place location marker at ends of plugged or capped unconnected storm service laterals. Each marker shall consist of 50 x 100 mm stake extending from pipe invert to 0.6 m above final finished landscape grade. Paint exposed portion of stake red with designation STM SWR in black.

### 3.7 FIELD TESTS AND INSPECTIONS

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 Remove foreign material from sewers and related appurtenances by flushing with water.
- .3 For newly installed storm sewer and catchbasin leads, the Contractor is responsible for the proper cleaning of the line to provide a complete continuous video of 100% of the newly installed storm sewer.
- .4 Contractor to carry out video inspection of installed storm sewers by closed circuit television equipment. Notify Owner's Representative 24 hours in advance of inspection.
- .5 Scheduling:
  - .1 The video inspection shall be first performed when the storm sewer has been cleaned and all manhole adjustments and street reinstatement have been completed.

- .2 Repeat video inspection of the sanitary sewer system, after all repairs have been made (at the discretion of the Owner's Representative). Notify Owner's Representative 24 hours in advance of inspection.

### 3.8 **DEFECTIVE SEWERS IDENTIFIED DURING VIDEO INSPECTION**

- .1 Storm sewers shall be inspected for alignment and obstruction. WATER PONDING IN GRAVITY SEWERS that can not be eliminated by flushing and cleaning will be considered as evidence of pipe settlement. Any and all defects such as water ponding, exposed gasket, 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 City. The initial video inspection shall be at the cost of the Contractor and any costs for re-video of sewer mains required to inspect repaired defects will be at the Contractor's expense.

**END OF SECTION**