

Project Manual Specifications

For

TOWN OF MARATHON

PEBBLE BEACH REVITALIZATION
38 Howe Street, Marathon Ontario

Issued for Tender, Permit, and Construction August 25, 2022
Optional Site Visit August 31, 2022
Closing Date September 22, 2022

Architectural Project No. 2211



1 Consultants

.1 The following are the consultants and sub-consultants who have prepared the Contract Documents.

PRIME CONSULTANT / ARCHITECT

Critchley Hill Architecture Inc.
123 McIntyre Street W
North Bay, Ontario P1B 2Y5

Tel: (705) 995-2391

2 Sub-Consultants

LANDSCAPE ARCHITECT

Hapa Collaborative Landscape Architecture Urban Design
403 - 375 West Fifth Avenue Vancouver BC V5Y 1J6

Tel: 604-909-4150

CIVIL ENGINEERS

TBT Engineering Consulting Group
1918 Yonge Street
Thunder Bay, ON P7E 6T9

Tel: (807) 624-5160
Fax: (807) 624-5161

STRUCTURAL ENGINEERS

TBT Engineering Consulting Group
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MECHANICAL & ELECTRICAL ENGINEERS

TBT Engineering Consulting Group
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END OF SECTION

PART 1 GENERAL

1.1 INVITATION

Critchley Hill Architecture Inc. on behalf of The Town of Marathon shall receive tenders from General Contractors for the supply of all of the goods and/or services specified in this tender call.

Tender Bids clearly marked “**2211 Pebble Beach**” shall be received by the **Critchley Hill Architecture** no later than **2:00:00 PM** EDT on or before **Thursday September 22, 2022**.

Merx E-Submissions

The Tender Form shall be submitted by Merx e-submission on or before the respective dates and times as noted above.

To submit a bid through Merx e-submission, contractor must register and order this opportunity. Documents must be downloaded from Merx including all addendum.

Please note that large bids or bids with many documents can be a factor in the amount of time it takes to upload and submit your bid. **It is recommended that you allow for at least 4 hours before closing time to upload and submit a tender package.**

Attach all required documents in .pdf format. The total file size of pdf documents may not exceed 100 MB.

Closing time will be taken from the Universal Time Clock (UTC) at <http://www.time.gov/>.

Attach all required documents in .pdf format. The total file size of pdf documents may not exceed 100 MB.

- .1 Tenders must be submitted on the Tender Form issued with Tender Documents.
- .2 All tender submissions will be closed to the public.
- .3 All blanks on Tender Forms must be filled in.
- .4 Bidders shall be solely responsible for the delivery of Tender in the manner and time prescribed.
- .5 All prices (unless otherwise specifically requested in Tender Documents) shall be for “Complete Job” prices and shall be understood to include for all materials, labour and other expenses as herein outlined in these contract documents including but not limited to fees, insurances, permits, compensation and other items required by governing regulations as well as overhead and profit for the work concerned.
- .6 Tenders must be submitted by e-submission Only. No other email address or facsimile transmission shall be used to submit tender documents.

1.2 INTENT

- .1 The intent of this bid call is to obtain an offer from General Contractors to provide services for the revitalization of **Pebble Beach**, within a Stipulated Price contract, in accordance with the Contract Documents. Work will include but is not limited to the following:
 - .1 Parking Lot, Sidewalks, and Landscaping
 - .2 Outlook Promenade, Boardwalks, Stairs
 - .5 Playground

1.3 CONTRACT DOCUMENTS AND OWNER IDENTIFICATION

- .1 The Contract Documents are identified as the:

Pebble Beach Revitalization
38 Howe Street, Marathon Ontario
Town of Marathon
Project No. 2211

- .2 The Owner of the Project:

Town of Marathon

1.4 CONTRACT /BID DOCUMENTS

- .1 Form of Contract
- .1 The CCDC Document 2, Stipulated Price Contract, 2020, will be used to form the Construction Contract. This document will be appended to this document to form the Contract Documents for the project. A sample of this document will be made available to Bidders upon individual request to the Consultant.
- .2 Definitions
- .1 Contract Documents: Defined in CCDC 2 - 2020 Edition, Definitions.
- .2 Bid Documents: Contract Documents supplemented with Instructions to Bidders, Soils Investigation Data, Designated substances survey, Bid Form, Bid Securities, and Bid Supplementary Forms identified herein.
- .3 Bid, Offer, or Bidding: Act of submitting an offer.
- .4 Bid Price: Monetary sum identified by the Bid Form.
- .3 Availability
- .1 Bid Documents may be obtained on Merx.com
- .2 Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer a license or grant for other purposes.
- .4 Examination
- .1 Upon receipt of Bid Documents verify that documents are complete; notify Consultant should the documents be incomplete.
- .2 Immediately notify the Consultant upon finding discrepancies or omissions in the Bid Documents.
- .5 Queries / Addenda
- .1 Direct questions to:
- Marie Derosier**
c/o Critchley Hill Architecture Inc.
123 McIntyre Street West
North Bay, Ontario P1B 2Y5
Tel: 705-995-2391
email: maried@critchleyhill.ca
- .2 Addenda may be issued during the bidding period. All addenda become part of the Contract Documents. Include costs in the Bid Price.
- .3 Verbal answers are only binding when confirmed by written addenda.

- .4 Clarifications requested by bidders must be in writing before date set for receipt of bids. The reply will be in the form of an addendum, a copy of which will be forwarded to known bidders before receipt of bids. Refer to item 1.17 schedule below.
- .6 Product/System Options
 - .1 Where the Bid Documents stipulate a particular product, alternative will be considered by the Consultant up to ten (10) days before receipt of bids.
 - .2 When a request to substitute a product is made, the Consultant may approve the substitution and will issue an Addendum to known bidders.
 - .3 In submission of alternatives to products specified, bidders shall include in their bid, any changes required in the work to accommodate such alternatives. A later claim by the bidder for an addition to the contract price because of changes in work necessitated by use of alternatives shall not be considered.
 - .4 The submission shall provide sufficient information to enable the Consultant to determine acceptability of such products.
 - .5 Provide complete information on required revisions to other work to accommodate each alternative, the dollar amount of additions to or reductions from the Bid Price, including revisions to other work.
 - .6 Unless alternatives are submitted in this manner and subsequently accepted, provide products as specified.

1.5 SITE ASSESSMENT

- .1 Site Examination
 - .1 Carefully examine and study all of the Contract Documents and inspect the Site of the work in order to determine all conditions affecting the work and associated costs.
 - .2 A copy of a detailed Geotechnical Investigation report is available under separate cover, titled as "Geotechnical Report, Pebble Beach Park Geotechnical Investigation, Town of Marathon, Ontario", Reference No. 21-1640, dated November 2021 and prepared by Tulloch Engineering Inc. The bidders are responsible for incorporating the information within the report obtained from the client into the project. Critchley Hill Architecture do not clarify any accuracy or accept any responsibility for any information contained in reports.
 - .3 Each bidder shall visit the site of the work before submitting a Bid and shall by personal examination be satisfied as to the local conditions that may be encountered during construction. Each Bidder shall make its own estimate of the available facilities and any difficulties that may be encountered and the nature of the sub surface materials and conditions. In connection with the site visit each Bidder shall examine the surrounding and adjacent public and private properties for existing conditions and limitations including but not limited to the rights and interest of other parties that may be interfered with during the construction.
 - .4 A **Optional** site visit to the project site has been arranged for bidders on: **Wednesday August 31, 2022 @ 2:30pm local time**. An Owner or employee of each prequalified contracting company must represent their respective company at the meeting. A brief summary of the project and the site will be reviewed. Contractors are to meet on the property to be developed.
 - .5 No Bidder shall claim, at any time after submission of its Bid, that there was any misunderstanding of the terms and conditions of the Contract Documents relating to site conditions.

- .6 No adjustment to the Progress Schedule or to the Bid price will be made for difficulties encountered due to conditions, features, and peculiarities of the site that were evident at the time of the close of Bids.
- .7 The act of submitting a tender is confirmation that the Bidder has visited the project site and surrounding properties and has become familiar with the place of work including the complete geotechnical investigation.

1.7 QUALIFICATIONS

- .1 The Bidder may be asked to provide detailed information on the professional qualifications of all staff who are expected to be involved with the work. Also, it is critical that the Bidder identify a single senior individual who shall co-ordinate the work from beginning to end. All work shall be performed diligently and to a high standard of professional competence by all parties
- .2 Subcontractors
 - .1 The Owner reserves the right to reject a proposed subcontractor for reasonable cause.
 - .2 Refer to CCDC 2 Article GC 10 of General Conditions.
 - .3 It is suggested that the Contractor give careful consideration to the suitability of the sub-contractors listed on the Tender Form.

1.8 BID SUBMISSION

- .1 Bid Ineligibility
 - .1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetic errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared informal.
 - .2 Bids with Bid Forms and enclosures which are improperly prepared will be declared informal.
 - .3 Bids that fail to include security deposit, bonding or insurance requirements will be declared informal.
 - .4 The Merx e-submission process permits the bidder to revise their bid form as often as necessary prior to bid closing time.
 - .5 Bidding Contractors shall govern themselves accordingly and accept all risks with submitting a bid via e-submission. Contractors are encouraged to submit tender forms early.
 - .6 Town of Marathon shall not be held responsible for any such equipment malfunctions, printing malfunctions, power failures or any other such instances that would otherwise prohibit the tender form from being submitted.
 - .7 Bids with Bid Forms that do not have a price for each separate price, additional price or alternate price shall be declared informal and returned to the Bidder without further consideration by the Owner.
- .2 Submissions
 - .1 Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
 - .2 Submit one copy of the executed offer on the Bid Forms provided, signed together with the required insurance, clearly identified with project name and submit by Merx e-submission, attach all required documents as outlined in 1.1.1 above.
 - .3 Improperly completed information, irregularities in bid bond, may be cause not to open the bid envelope or declare the bid informal.
 - .4 An abstract of submitted bids will be made available to bidders following bid opening.

1.9 BID ENCLOSURES/REQUIREMENTS

- .1 Security Deposit

-
- .1 Each Tender Form Section 00300 shall be submitted with a Bid Bond in the name of an approved surety, made payable to owner in an amount equal to **10% (ten percent) of the Tender Price**, as a guarantee that the Bidder will, if the tender is accepted, execute a general construction contract as specified herein and provide the specified Performance and Labour and Materials Bonds within ten (10) days of acceptance.
 - .2 Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal Contractor and surety.
 - .3 Use Bid Bond form CCDC 220.
 - .4 The security deposit will be returned after delivery to the Owner of the required Performance and Labour and Materials Payment Bond (s) by the accepted bidder.
 - .5 If no contract is awarded, all security deposits will be returned.
 - .2 Agreement to Bond
 - .1 Submit with the Tender Form Section 00300 and Bid Bond, an Agreement to Bond, stating that the surety providing the Bid Bond is willing to supply the Performance and Labour and Materials Payment Bond required.
 - .2 Include the cost of bonds in the Bid Price.
 - .3 Performance Assurance
 - .1 The accepted bidder shall provide a 50% of Construction Costs Performance Bond and 50% of Construction Cost Labour and Materials Payment Bond.
 - .4 Undertaking of Insurance
 - .1 Submit with the Tender Form Section 00 41 00 a signed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.
 - .5 Bid Form Requirements
 - .1 State in the Bid Form, the time required to complete the work. The Substantial Completion date in the Agreement shall be calculated based on the number of weeks of construction indicated in the Bid Form commencing from the date of award of contract. The commencement date of the construction schedule in the agreement will be the date of Award of Contract.
 - .2 Include the names of all Subcontractors and the portion(s) of the work the Bidder will perform as per the list provided within the Bid Form.
 - .6 Bid Signing
 - .1 The Bid Form shall be signed by the bidder.
 - .2 Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 - .3 Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word partner under each signature.
 - .4 Limited Company: Signature of a duly authorized signing officer (s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. If the bid is signed by officials other than the President and Secretary of the company, or the President and Secretary of the company, or the President-Secretary-Treasurer of the company, a copy of the by-law resolution of the Town of Directors authorizing them to do so, must also be submitted with the bid in the bid envelope.
 - .8 Taxes
 - .1 Base Bid Price (Tender Price) excludes required Harmonized Sales Tax (HST).
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- .9 Cash Allowances
 - .1 Cash Allowances shall be **included** in the Base Bid in accordance with Part 4 of the General Conditions of the Contract. Cash Allowances are identified in Division 01.

1.10 OFFER ACCEPTANCE/REJECTION

- .1 Duration of Offer.
 - .1 Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date.
- .2 Bid Evaluation and Acceptance
 - .1 The Owner will evaluate the offers (Tenders) received and identify the offer which represents "**best value**"; the interpretation of which will be made by the Owner.
 - .2 If requested by the Owner, Bidders will meet with the Owner to discuss their offer.
 - .3 The Owner reserves the right to accept or reject any or all offers the lowest or any other tender not necessarily accepted.
 - .4 During bid evaluation the Base Bid and Construction Time will be used to evaluate the successful bid. The alternate prices, separate prices and additional prices associated with the lowest bid will be evaluated for discrepancies and best value. The owner reserves the right to negotiate the value of the alternate prices; separate prices and additional prices. If negotiations over the value of alternate prices fail, separate prices and additional prices fail, the owner reserves the right to proceed with the next low bidder.
 - .5 After acceptance by the Owner, the Consultant on behalf of the Owner, will issue to the successful bidder, a written bid acceptance.
 - .6 After a bid has been accepted, all rejected bids will be returned to the respective bidders with submitted bid securities and other requested enclosures.
 - .7 The Owner is not obligated to provide an explanation of its decision with regard to the acceptance or rejection of any tender.
 - .8 In addition to the provisions stated in Separate, Additional, and Alternative Prices of Section 00 41 00 Tender Form, the Owner reserves the right, if necessary to reduce costs to further delete or substitute work during negotiations with the low bidder as part of the evaluation of the base bid.

1.11 MUNICIPAL FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT (MFIPPA)

- .1 Bidders are advised that the Town is governed by Ontario's Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA") and information submitted to the Town in response to this RFT may be subject to disclosure under MFIPPA. A Bidder should identify any information in its Bid or any accompanying documentation supplied in confidence for which confidentiality is to be maintained by the Town and is advised to consult with their own legal advisors regarding the appropriate way to identify such information. The Town will make reasonable efforts to safeguard confidential information, subject to its disclosure requirements under MFIPPA or any disclosure requirements imposed by law or by order of a court or tribunal. Bidders are advised that their bids will, as necessary, be disclosed, on a confidential basis, to advisers retained by the Town to advise or assist with the RFT process, including the evaluation of bids. If a Bidder has any questions about the collection and use of information pursuant to this RFT, questions are to be submitted to the RFT Contact.

1.12 NO INFLUENCE

- .1 The Town prohibits its representatives from using their official position for personal financial gain, or from accepting any personal advantage from anyone under circumstances which might reasonably be interpreted as an attempt to influence the recipient in the conduct of their duties, extend any gratuity or special favor to the proponent, or to influence the outcome of any proposal. The Town reserves the right to disqualify the tender of any bidder who engages in any acts or practices.

1.13 BROADER PUBLIC SECTOR PROCUREMENT DIRECTIVE

- .1 This Process is subject to the Broader Public Sector Procurement Directive, Canadian Free Trade Agreement (CFTA) and the Canada-European Union Comprehensive Economic and trade Agreement (CETA).

1.14 INAPPROPRIATE CONDUCT

- .1 The Town may disqualify a bidder's tender and give it no further consideration 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:
- .1 The submission of proposals or quotations containing misrepresentations or any other inaccurate, misleading or incomplete information;
 - .2 The refusal of the proponent to honor its previous commitments; or
 - .3 Any other conduct constituting a conflict of interest. For the purposes of this section, "conflict of interest" shall have the meaning ascribed to it on the Proposal Submission Form.

1.15 AGREEMENT TO ABIDE BY THE ESTABLISHED TENDER PROCESS

- .1 No proponent can be seen to be deriving, intentionally or otherwise, an advantage, information or benefit which is not available to all other Bidders or from any special or personal relationships or contacts, or seeking or obtaining any advantage or information from any staff and representatives of the The Northwest Catholic District School Town, whether authorized or not. The Tender Form includes a clause which confirms concurrence with the Tender Process. In signing the Tender Form, Bidders are agreeing to abide by the established process.

1.16 REFERENCE CODES STANDARDS AND REGULATIONS

- .1 All Sections:
Delete suffixes for Codes, Standards and Regulations which indicate a particular year.

Add: Codes, Standards and Regulations to be latest current versions in force at the time of Tender.
- .2 Where relevant documents applicable to this work exist, follow these criterion, recommendations, and requirements as minimum standards.
- .3 In event of conflict between Codes, Regulations, or Standards, or where work shown is in conflict with these documents, obtain interpretation before proceeding. Failure to clarify any ambiguity will result in an interpretation requiring application of most demanding requirements.

1.17 PROJECT SCHEDULE

.1 **Timetable**

Optional Site Meeting	August 31, 2022 @ 2:30pm
Deadline for Questions	September 15, 2022
Deadline to issue Addendum	September 20, 2022
Submission Deadline	September 22, 2022

The project must commence within 5 working days of award of contract.

END OF SECTION

PART 1 GENERAL

1.1 GEOTECHNICAL REPORT

- .1 A copy of the geotechnical investigation report is included under separate cover, titled "Geotechnical Investigation, Pebble Beach Park Geotechnical Investigation, Town of Marathon, Ontario". Reference No 21-1640 and dated November 2021 and prepared by Tulloch.
- .2 The report, by its nature, cannot reveal all conditions that exist or can occur on the site. Should subsurface conditions be found to vary substantially from the report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the contract Price accruing to the Owner.
- .3 The report was commissioned by the client and not prepared by Critchley Hill Architecture Inc. It is included in these specifications for information only. CH Architecture are not responsible or do not accept any form of liability for information contained in this document.

END OF SECTION

Tender Form Submitted By Name: _____
Address: _____
Telephone: _____
email: _____

Base Bid We offer to enter into a Contract to perform the Work required by the Tender Documents for the stipulated price of:

_____ (\$ _____)

The above Base Bid offer does not include HST.

HST Amount Amount of HST for the above Base Bid is:

Construction Time We agree to complete the Work in accordance with the Tender Documents. We agree to be Ready-For-Takeover of the Work within _____ months from access to site. We acknowledge and agree that the Construction Time will be evaluated with the Base Bid to determine the successful bid.

Confirmation of Documents and Addenda We acknowledge our compliance with the Instructions to Bidders and the Tender Documents relating to the Work, including all Addenda numbered as follows:

Allowances We have included all allowances as Specified under Division 01 within our Base Bid price.

Tender We agree and acknowledge that the lowest or any of the submitted Tenders will not necessarily be accepted.

We agree and acknowledge that this Bid is irrevocable and open to acceptance for a period of 60 days from the date of Bid Closing.

DECLARATIONS IN TENDER FORM

AGREEMENT TO ABIDE BY ESTABLISHED PROCESS

3.4.1 Conflict of Interest

For the purposes of this Tender, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where:

- (a) in relation to the Tender process, the respondent has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including but not limited to;
 - i. having, or having access to, confidential information of the Town in the preparation of its quotation that is not available to other respondents, or
 - ii. communicating with any person with a view to influencing preferred treatment in the Tender process (including but not limited to the lobbying of decision makers involved in the Tender process), or
 - iii. engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive Tender process or render that process non-competitive or unfair, or
- (b) in relation to the performance of its contractual obligations under a contract for the Deliverables, the respondent's other commitments, relationships or financial interests';
 - i. could, or could be seen to, exercise an improper influence over the objective, unbiased and impartial exercise of its independent judgement, or
 - ii. could, or could be seen to, compromise, impair or be incompatible with the effective performance of its contractual obligations.

The Bidder shall declare in its Tender any situation that may be a conflict of interest or a potential or perceived conflict of interest of the Bidder, including but not limited to its obligations to the Town of Marathon, the contract, the contract price or any customer.

The Town of Marathon has a fiduciary responsibility to ensure that such behaviour is not permitted and reserves the right to remove from eligibility, the name of any Bidder for failure to comply with the above conditions.

The Bidder declares that this proposal is not made in connection with any other Bidder submitting a Tender for the same commodity/service and is, in all respects, fair and without collusion or fraud.

Based on the above, do you believe your firm may be in possible conflict of interest? Please check appropriate answer.

_____ No

_____ Yes – If yes is selected please submit with your documents a detailed description

BID ENCLOSURES/REQUIREMENTS

The following documents are required as part of a complete Tender Form submission (Answer Yes or No to each Question)

CONFIRMATIONS	YES	NO
<i>Security Deposit</i> Each Tender Form Section 00 41 00 shall be submitted with a <u>Bid Bond</u> in the name of an approved surety, made payable to owner in an amount equal to 10% (ten percent) of the Tender Price.		
<i>Agreement to Bond</i> Submit with the Tender Form Section 00 41 00 and Bid Bond, an Agreement to Bond, stating that the surety providing the Bid Bond is willing to supply the Performance and Labour and Materials Payment Bond required.		
<i>Insurance</i> Submit with the Tender Form Section 00 41 00 a signed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.		
<i>Cash Allowances</i> Cash Allowances shall be <u>included</u> in the Base Bid in accordance with Part 4 of the General Conditions of the Contract. Cash Allowances are identified in Division 01. OH & P for allowance is part of base bid.		

UNIT PRICE BID FORM

1. This Bid is based on and submitted in accordance with Unit Price Schedule below and which forms an integral part of this bid.
2. The total amount of the bid is the sum of all unit price extensions, and allowances. It is understood that the unit prices, will be checked and if arithmetical errors are discovered, the unit prices shall be considered as representing the Bidder's intentions and the unit price extensions and the total amount entered in the Unit Price Schedule and the Bid Form will be corrected accordingly.

#	Item	Quantity	Unit	Unit Price	Total Item Price
1.0 SITE PREPARATION & REMOVALS (as per drawings, details and specifications)					
.1	Mobilization: includes Health and Safety Plan, utility clearances and locates; bonding, site layout, tree protection fencing, securing the construction site with "Modu-loc" or approved equal steel fencing, and obtain all necessary permits and notifications.	1	l.s.		
.2	Rough Grading: As per grading plan.	1	l.s.		
.3	Removals: As per existing conditions & removals plan L1.01.	1	l.s.		
2.0 HARDSCAPE (as per drawings, details and specifications)					
.1	Asphalt: as per civil drawings		m ²		
.2	Concrete Pathway: as per civil drawings	478	m ²		
.3	Monolithic Concrete Curb: includes the supply and installation of concrete, granular base, rebar and compaction testing.	30	l.m.		
.4	Crushed Granite Surface: includes the supply and installation of crushed granite, granular base, and compaction testing.	430	m ²		
.5	Wood Decking with Concrete Pad: includes the supply and installation of timber, galvanized fastenings, concrete, granular base, and compaction testing.	16.3	m ²		
.6	Wood Decking - Upper: includes the supply and installation of timber, galvanized fastenings, granular base, and compaction testing.	44	m ²		
.7	Wood Decking - Lower: includes the supply and installation of timber, galvanized fastenings, granular base, and compaction testing.	24.7	m ²		

.8	Wood Decking - Lower w/ Steel Beams: includes the supply and installation of timber, galvanized fastenings, steel beams granular base, and compaction testing.	30	m ²		
.9	Wood Decking - Viewing Deck: includes the supply and installation of timber, galvanized fastenings, steel beams granular base, and compaction testing.	16.5	m ²		
.10	Timber Boardwalk w. Edge Guard: includes the supply and installation of timber, granular base, and compaction testing.	688	m ²		
.11	Painted Lines (Parking): includes the supply and installation of paint on asphalt.	1	l.s.		
.12	Painted Lines (Cross Walk): includes the supply and installation of paint on asphalt.	1	l.s.		
.13	Concrete Ramp (Play Area): includes the supply and installation of concrete, dowels, white paint, granular base and compaction testing.	1	ea.		
3.0 SOFTSCAPE (as per drawings details and specifications)					
Planting to include all plants, planting soil, amendments, staking, mulch, maintenance and appurtenances.					
.1	Deciduous Tree - Large (80mm CAL)	1	ea.		
.2	Deciduous Tree - Medium (50mm CAL)	93	ea.		
.3	Coniferous Tree - Large (3.0m HT.)	1	ea.		
.4	Shrub - #2 Pot	1172	ea.		
.5	Perennials & Ornamental Grasses	2621	ea.		
.6	Sod: includes supply and installation with 150mm Topsoil and fine grading.	396	m ²		
.7	Seed: includes supply and installation with 150mm Topsoil and fine grading.	1556	m ²		
.8	Native Seed Mixture: includes supply and installation with 150mm Topsoil and fine grading.	406	m ²		
4.0 SITE FURNISHINGS (As per drawings, details and specifications)					
.1	Accessible Picnic Table: includes supply and installation of accessible picnic table, model # EP 2630 HAND, as supplied by Equiparc.	1	ea.		
.2	Picnic Table: includes supply and installation of picnic table, model # EP 2630, as supplied by Equiparc.	2	ea.		
.3	Accessible Square Picnic Table: includes supply and installation of accessible picnic table, model # EP 2886 GP HAND-RS, as supplied by Equiparc.	1	ea.		

.4	Square Picnic Table: includes supply and installation of picnic table, model # EP 2886 GP, as supplied by Equiparc.	3	ea.		
.5	Waste Receptacle: includes supply and installation of Standard Mini Hid-A-Bag II, complete with side load door. Model # SP-HBIIA-P, as supplied by Haul-All Equipment Systems. Includes supply and installation of concrete pad and surface mount.	1	ea.		
.6	Sand Play Transfer Station	1	l.s.		
.7	Hill Side Transfer Station & Steps	1	l.s.		
.8	Playground Seating Boulders: does not include boulders shown as part of the Pebbled Water Feature detail.	3	ea.		
.9	Landscape Boulders: does not include any boulders shown in Materials Plan L1.12 of the playground area.	1	l.s.		
.10	Timber Vehicle Barrier: includes the surface mount installation of existing bench on a concrete pad	9	ea.		
.11	Timber Vehicle Barrier (Accessible Parking Space): includes the surface mount installation of existing bench on a concrete pad	2	ea.		
.12	Custom Wood Bench: includes supply and installation of 1260mm wide timber top c/w 1130mm wide concrete base.	27	l.m.		
.13	Relocated Bench: includes the surface mount installation of existing bench on a concrete pad	1	ea.		
.14	Relocated Picnic tables	1	l.s.		
.15	Relocated 2-post sign: includes the relocation and installation with new footings.	1	ea.		

5.0 PLAY EQUIPMENT & PLAY SURFACING (as per drawings, details and specifications)

	Play Equipment				
.1	Stainless Steel Hill Slide: Includes supply, freight, installation, and engineering certification of 'Elephant Play' Hill Slide Model# SSL1000	1	l.s.		
.2	Net Climber: Includes supply, freight, installation, and engineering certification of 'Elephant Play' 34% Slope Net Climber Model# EP-CT-FILB1000 Custom	1	l.s.		
.3	Roman Arch Swings - 2 Bay: Includes supply, freight, installation, and engineering certification of 'Elephant Play' 2 Bay Swing Model# ESR1002 Includes 1 Accessible, 1 Toddler Seat, 2 Flat Rigid Seat.	1	l.s.		
.4	Rotating Dish: Includes supply, freight, installation, and engineering certification of 'Elephant Play'	1	l.s.		

	Rotating Dish Model# ERD820S				
.5	Playground Pump: Includes supply, freight, installation, and engineering certification of 'Ape Studio' Playground Pump Model# A5.17630 or approved equal.	1	l.s.		
.6	Pebble Water Feature: Includes supply and installation of concrete channel, boulders, wood deck on concrete pad. Includes installation of pebbles with mortar, to be supplied from site excavation.	1	l.s.		
.7	Stepping Logs: Includes supply and installation.	1	l.s.		
.8	Sand Play Border: Includes supply and installation.	20	l.m.		
.9	Play Sand: includes supply and installation of play sand, granular base, filter fabric and compaction testing.	23	m ²		
.10	Engineered Wood Fiber Surface: includes supply and installation of engineered wood fiber safety surfacing, granular base, filter fabric and compaction testing.	212	m ²		
6.0 STAIRS & RAILINGS (as per drawings, details and specifications)					
.1	CIP Concrete Stairs (5 riser): Includes the supply and installation of concrete, rebar, TWSI, granular base and compaction testing.	3	ea.		
.2	Stainless Steel Handrail	6	ea.		
.3	Galvanized Steel Guardrail with Cable Rail:	13	l.m.		
TOTAL BASE BID PRICE					

APPENDIX ADP - Additional Prices

The following prices are offered as additions to the base bid. Additional Prices do not include Harmonized Sales Tax (HST). Additional Prices include all overhead and profit for the work. As per the Instruction to the Bidders, the Owner at their discretion, may select the alternate price upon evaluation of the bid submission.

ADDITIONAL PRICE NO. 1

Washroom Shower Facility

Provide an additional price for all work to construct washroom facility/change house. Refer to Architectural, Structural, Mechanical and Electrical drawings and specifications. Work of this additional price includes all foundations, sanitary, structural/architectural facility.

Note: Below ground electrical and plumbing to facility will be part of base bid scope.

ADD _____ (\$ _____)

ADDITIONAL PRICE NO. 2

Wilderness Trail

Provide an additional price for all work to construction wilderness trail as indicated on Landscape Architect drawings and specifications. Work to include supply and installation of timber steps, crushed granite surfacing, timber edger for granular surfacing, wood decking platform, and native seed mixture.

.1	Timber Steps (5 riser): Includes the supply and installation of timber, rebar, galvanized spikes, crushed granite, granular base and compaction testing.	6	ea.		
.2	Timber Steps (3 riser): Includes the supply and installation of timber, rebar, galvanized spikes, crushed granite, granular base and compaction testing.	11	ea.		
.3	Wood Decking - Staircase Platform: includes the supply and installation of timber, galvanized fastenings, steel beams granular base, and compaction testing.	14.6	m ²		
.4	Timber Edger for Crushed Granite Surface: includes the supply and installation.	31.3	l.m.		
Total					

The following are the Sub-Contractors we propose to use for the divisions or sections of the Work as outlined. The prices and applicable taxes for the sections of Work are included in the Base Bid amount.

[illegible]

_____	_____	_____
_____	_____	_____

APPENDIX KP-KEY PERSONNEL

The following is a list of the Bidders principle and key personnel who shall be assigned to this project. Attached to this Bid Form are detailed summaries of qualifications and related work experience for each person.

Head Office

Project Manager: _____

Project Administrator _____

Safety Supervisor: _____

Site Personnel

Superintendent: _____

General Foreman _____

Signed, and submitted for and on behalf of:

Company Name

Address

Name and Title

Witness Name and Title

Signature

Witness Signature

Date

1 CONTRACT FORM

- .1 This section of the final Contract Documents shall contain a copy of CCDC Document 2, Stipulated Price Contract, 2020.
- .2 A copy of the noted CCDC document is available from the Consultant upon request from the Bidder.
- .3 By submitting a tender, the Bidder acknowledges that the Bidder and all related Sub-Contractors are fully aware of the proposed CCDC document.
- .4 The balance of the Contract Form will be completed upon acceptance of a Bid.

The Standard Construction Document for a Stipulated Price Contract, English version, consisting of the Agreement between the Owner and the Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 12 inclusive, governing the same is made part of these Contract Documents, with the following amendments, additions, and modifications:

ARTICLE A-5 – PAYMENT

- .1 Amend paragraph 5.1.3, in the first line, by deleting the words "...the issuance of the..." and replacing them with "...receipt of the Consultant's...".
- .2 In paragraph 5.1.1 of Article A-5 add the following words to the end:
- "or, where there is no Payment Certifier, jointly by the Owner and Contractor"

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

- .1 Delete paragraph 6.5 of Article A-6 in its entirety and replace it with the following:
- "6.5 Contact information for a party may be changed by Notice in Writing to the other party setting out the new contact information in accordance with this Article."

DEFINITIONS

Owner Amend Definition by adding the following to the end of that Definition:

"For purposes of the Contract, the terms "Owner", and "Town of Marathon" shall be considered synonymous. For the Project, the Owner's representative is "Marc Paris or other to be Named."

Add Definition, Provide, as follows:

"*Provide*" means to supply and install. Provide has this meaning whether or not the first letter is capitalized."

Add a new Definition, Act, as follows:

"*Act*" means the Construction Act (Ontario)."

Add a new Definition, By Others, as follows:

"The words '*By Others*' when used in the Specifications or on the Drawings means a person performing part of the Work, other than the Contractor. For greater certainty, the only means by which work or services shown or specified shall be indicated as not being in the Contract is by use of the initials 'N/C' or the words 'Not In Contract' or the words '*by Owner*'."

Add a new Definition, Construction Schedule, as follows:

"*Construction Schedule*" means the schedule for the performance of the Work provided by the Contractor pursuant to GC3.5, including any amendments to the Construction Schedule made pursuant to the Contract Documents."

Add a new Definition, Environmental Programs, as follows:

"*Environmental Programs*" means the environmental plans, programs, procedures and requirements of the Owner found in the manual prepared and maintained by the Owner and referred to in the Instructions to Bidders. The Environmental Programs include Owner's Asbestos Control Program, its mould program and a program for controlling and handling designated substances."

Add a new Definition, Exposed, as follows:

“*Exposed*” means visible by the *Owner* at the completion of the *Work*, unless otherwise indicated in the *Contract Documents*. *Exposed* items include all items on roof areas, mechanical and service rooms, inside of cupboards, cabinets and similar items.”

Add a new Definition, Force Majeure, as follows:

“*Force Majeure*” means any cause, beyond the *Contractor’s* control, other than bankruptcy or insolvency, which prevents the performance by the *Contractor* of any of its obligations under the *Contract* and the event of *Force Majeure* was not caused by the *Contractor’s* default or active commission or omission and could not be avoided or mitigated by the exercise of reasonable effort or foresight by the *Contractor*. *Force Majeure* includes *Labour Disputes*, fire, unusual delay by common carriers or unavoidable casualties, civil disturbance, acts, orders, legislation, regulations or directives of any government or other public authority, acts of a public enemy, war, riot, sabotage, blockage embargo, shortage of materials and supplies, lightning, earthquake, abnormally adverse weather conditions or acts of God.”

Add a new Definition, Install, as follows:

“*Install*” means install and connect. *Install* has this meaning whether or not the first letter is capitalized.”

Add a new Definition, Labour Dispute, as follows:

“*Labour Dispute*” means any lawful or unlawful labour problems, work stoppage, labour disruption, strike (including lockouts decreed or recommended for its members by a recognized contractor's association of which the *Contractor* is a member or to which the *Contractor* is otherwise bound), job action, slow down, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the *Work*.”

Add a new Definition, OHSA, as follows:

“*OHSA*” means the Occupational Health and Safety Act (Ontario)”

Add a new Definition, Request for Information, as follows:

“*Request for Information*” or “*RFI*” means written documentation sent by the *Contractor* to the *Owner* or to the *Owner’s* representative or to the *Consultant* requesting written clarification(s) and/or interpretation(s) of the *Drawings* and/or *Specifications*, *Contract* requirements and/or other pertinent information required to complete the *Work* of the *Contract* without applying for a change or changes to the *Work*.”

Add a new Definition, Submittals, as follows:

“*Submittals*” means documents or items required by the *Contract Documents* to be provided by the *Contractor* such as:

- *Shop Drawings*, samples, models, mock-ups to indicate details or characteristics, before the portion of the *Work* that they represent can be incorporated into the *Work*; and,
- Record drawings and manuals to provide instructions to the operation and maintenance of the *Work*”

Add a new Definition, reviewed, instructed, required, directed, permitted, inspected, ordered, as follows:

“Wherever the words ‘reviewed’, ‘instructed’, ‘required’, ‘directed’, ‘permitted’, ‘inspected’, ‘ordered’ or similar words are used they shall mean, unless the context provides otherwise, ‘reviewed by the *Consultant*’, ‘instructed by the *Consultant*’, ‘required by the *Consultant*’, ‘directed by the *Consultant*’, ‘permitted by the *Consultant*’ and ‘ordered by the *Consultant*’.”

Add a new Definition, satisfactory, as follows:

“Wherever the word ‘satisfactory’ or similar words or phrases are used in the *Contract Documents*, it means,

unless the context provides otherwise, 'satisfactory to the Owner and the Consultant'."

Add new Definition, As-Constructed Documents, as follows:

"*As-constructed Documents* refer to reproductions of the original drawings and specifications which have been marked up to accurately show all changes from the original documents and which are to be provided in clearly marked and legible hard copies. As-Constructed Documents may also be known as As-Built Drawings"

Add new Definition, Constructor, as follows:

"The *Constructor* is as defined in the *Occupational Health and Safety Act*, R.S.O.1990 (latest amendment), referring to the person undertaking the project for the *Owner*, and for the purposes of this project, shall be the *Contractor*."

Add new Definition, Proper Invoice, as follows:

"For purposes of the Contract, the terms "Proper Invoice", "Progress Application", and "Contractor Application for Payment" shall be considered synonymous. Proper Invoice means a "proper invoice" as defined in the Payment Legislation, if any, and as may be modified by written agreement between the parties to the extent permitted by such Payment Legislation.

Add new Definition. Adjudicable Dispute, as follows:

"For purposes of the *Contract*, the term "Adjudicable Dispute", means any dispute or difference between the parties arising out of or in connection with the Contract."

Add new Definition. Payment Period, as follows:

"For purposes of the *Contract*, the term "Payment Period", means monthly period, ending on the last day of the month in connection with the Contract."

1 GENERAL

- 1.1 Where a General Condition or paragraph of the General Conditions of the Stipulated Price Contract is deleted by these Supplementary Conditions, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused.

PART 1 GENERAL PROVISIONS

GC1.1 CONTRACT DOCUMENTS

- .1 Amend paragraph 1.1.1 by adding the following between the first and second sentences:

"In many cases, the language of the *Contract Documents* is written in the imperative for the sake of brevity. Clauses containing instructions or directions are intended for the *Contractor* and such sentences are deemed to include the words, ... "the *Contractor* shall"."

- .2 Delete paragraphs 1.1.3 and 1.1.4 in their entirety and replace them with the following:

"1.1.3 The Contractor shall review the Contract Documents for the purpose of facilitating and co-ordination and execution of the Work by the Contractor. The Contractor shall report promptly to the Consultant any ambiguities, design issues or other matters requiring clarification made known to the Contractor or that the Contractor may discover from such a review. Such review by the Contractor shall comply with the standard of care described in paragraph 3.9.1 of the Contract.

- 1.1.4 Except for its obligation to review the Contract Documents and report the result pursuant to paragraph 1.1.3, the Contractor is not responsible for ambiguities, design issues or other matters requiring clarification in the Contract Documents and does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. Without limiting the foregoing, the Contractor shall not be liable for any damages or costs resulting from any ambiguities, design issues or other matters requiring clarification in the Contract Documents which the Contractor could not reasonably have discovered from such a review in accordance with the standard of care. If the Contractor does discover any ambiguities, design issues or other matters requiring clarification in the Contract Documents, the Contractor shall not proceed with the work affected until the Contractor has received modified or additional information from the Consultant. The impacts of any ambiguities, design issues or other matters requiring clarification in the Contract Documents, including to the Contract Price and Contract Time, shall be addressed by the parties in accordance with Part 6 – CHANGES.”
- .3 Amend paragraph 1.1.5 by adding subparagraphs 1.1.5.6, 1.1.5.7, and 1.1.5.8 as follows:
- .6 Finishes in the room finish schedules shall govern over those shown on the *Drawings*.
 - .7 Schedules of Division 01 – General Requirements of the *Specifications* shall form part of and be read in conjunction with the technical specification section as listed in the table of contents of the *Specifications*.
 - .8 Architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the *Consultant* or its sub-*Consultants* are to remain with each of the applicable drawing disciplines.
Fixturing drawing provided by the *Owner* shall have precedence over architectural drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts.”
- .4 Amend paragraph 1.1.6 by adding the following to the end of that paragraph:
- “The *Specifications* are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Consultant* to settle disputes among the *Subcontractors* and *Suppliers* in respect to such divisions. The *Drawings* are, in part, diagrammatic and are intended to convey the scope of the *Work* and indicate general and appropriate locations, arrangement and sizes of fixtures, equipment and outlets. The *Contractor* shall obtain more accurate information about the locations, arrangement and sizes from study and coordination of the *Drawings*, including *Shop Drawings* and shall become familiar with conditions and spaces affecting these matters before proceeding with the *Work*. Where site conditions require reasonable minor changes in indicated locations and arrangements, the *Contractor* shall make such changes at no additional cost to the Owner. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the *Contractor* shall include such relocation in the *Work*. The *Contractor* shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are that portion of the *Contract Documents* wherever located and whenever issued, compiling information of similar content and may consist of drawings, tables and/or lists.”
“The *Contract Documents* are organized by Division for clarity and to identify the expected standard of trade competence in the finished work. No claims will be considered relating to the division of work between the *Contractor* and/or *Subcontractors*, including tie in of the work of different trades, spatial interferences, cutting and patching and the like.”
- .5 Add to the end of subparagraph 1.1.6.2
- “Except to the extent the Consultant is indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4 and in 13.1.3.

- .6 Add new paragraph 1.1.12 as follows:

"1.1.12 The Contractor will be issued electronic copies of "Issued for Tender, Permit, and Construction ". The documents will be issued in PDF format. The production of hardcopies of the document will be at the expense of the Contractor as necessary to facilitate the construction of the building."

- .7 Add a new paragraph 1.1.13 as follows:

"1.1.13 One set of signed and sealed *Contract Documents* shall be retained by each of the *Owner* and the *Contractor*."

PART 2 ADMINISTRATION OF THE CONTRACT

GC2.2 ROLE OF THE CONSULTANT

- .1 In paragraph 2.2.3 add the following to the end:

"Without limiting the foregoing, the Consultant may appoint one or more authorized representatives in writing who may fulfill the obligations of the Consultant under this Contract."

- .2 Under 2.2.5 add new sentence at the end of the paragraph as follows:

"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."

- .3 Amend paragraph 2.2.6 by deleting the words: "...except with respect to GC5.1 —FINANCING INFORMATION REQUIRED OF THE OWNER".

- .4 In paragraph 2.2.8 add the words ", written statements" after the word "interpretations" in both the first and second sentences; and

- i. add the following to the end of paragraph 2.2.8:

The *Owner* and the *Contractor* shall waive any claims against the *Consultant* arising out of its making of any interpretations, written statements or findings in accordance with paragraphs 2.2.6, 2.2.7, 2.2.8, and 7.1.2, but only to the extent that any such interpretations, written statements, and findings are made by the *Consultant* in an unbiased manner, and in accordance with the *Consultant's* professional standard of care at law

- .5 Amend paragraph 2.2.12 by adding the following to the end of that paragraph:

"If, in the opinion of the *Contractor*, the Supplemental Instruction involves an adjustment in the *Contract Price* or in the Contract Time, it shall, within ten (10) *Working days* of issuance of a Supplemental Instruction provide the *Consultant* with a written notice to that effect. In the event that the *Contractor* needs additional information to determine whether a Supplemental Instruction involves an adjustment of the *Contract Price* or in the Contract Time, it may issue a written request to the *Consultant* seeking such additional information. Following issuance of such information, the *Contractor* shall, within ten (10) *Working days* of receipt of such additional information provide the *Consultant* with the written notice described in the first sentence of this paragraph 2.2.13. Failure to provide written notification within the time stipulated in this paragraph 2.2.13 shall be deemed an acceptance of the Supplemental Instruction by the *Contractor* without adjustment in the *Contract Price* or Contract Time

- .6 Add the words "which are provided" before the words "in accordance" in paragraph 2.2.13.

- .7 Under 2.2.14, add new sentence as follows:

"If it is the *Contractor's* opinion that a *Supplemental Instruction, Change Order or Change Directive*, as issued by the *Consultant*, will affect the *Contract Time*, it shall within Seven (7) days after issuance of such *Supplemental Instruction or Change Order/Change Directive*, notify the *Consultant* in writing, of the nature and extent of the affect on the construction schedule.

.8 Add new paragraph 2.2.19 as follows:

"2.2.19 The *Specifications* are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Consultant* to settle disputes among *Subcontractors* and *Suppliers* in respect to such divisions."

GC2.3 REVIEW AND INSPECTION OF THE WORK

.1 Add to end of paragraph 2.3.2:

.1 "Should a designated test or inspection fail, the *Contractor* shall promptly correct and retest the work using the designated testing/inspection agency and be responsible for all costs associated with retesting. Unless agreed otherwise, the *Contractor* shall give the *Consultant* and the *Owner* at least three (3) *Working days'* notice of the date and time fixed for all required tests, and shall supply all labour, material, fuel, etc., and shall carry out such tests (unless otherwise specified)".

.2 To paragraph 2.3.3, add new sentence: "Such certificates and reports are to be reviewed by the *Consultant* and one copy is to be forwarded to the *Owner*".

GC2.4 DEFECTIVE WORK

.1 In paragraph 2.4.1:

- i. Add after the words "shall promptly correct" the phrase "in a manner acceptable to the *Owner* and the *Consultant*"; and
- ii. Add after the words "*Contract Documents*" the phrase "or work that the *Contractor* discovers to be defective, whether or not the defective work had been identified by the *Consultant*, and".

.2 Add new subparagraphs 2.4.1.1, 2.4.1.2 and 2.4.1.3 as follows:

"2.4.1.1 The *Contractor* shall rectify, in a manner acceptable to the *Owner* and the *Consultant*, all defective work and deficiencies throughout the *Work*, whether or not they are specifically identified by the *Consultant*.

2.4.1.2 The *Contractor* shall prioritize the correction of any defective *Work* which, in the sole discretion of the *Owner*, adversely affects the day to day operation of the *Owner*.

2.4.1.3 The correction of any defective *Work* that is to take place after the *Owner* has taken occupancy must be completed after operational hours or on weekends, unless otherwise agreed to between the *Owner* and *Contractor*."

.3 Add new paragraph 2.4.4 as follows:

"2.4.4 Where elements of the *Work* have been identified as defective by the *Owner* or *Consultant*, and the *Contractor* fails to make corrections to the *Work* in accordance with this GC 2.4, then without prejudice to any other right or remedy the *Owner* may have, the cost of correcting the *Work* shall be determined by the *Consultant* and the amount may be deducted from any amount otherwise due to the *Contractor*."

.4 Add paragraph 2.4.5 as follows:

"2.4.5 The *Contractor* shall prepare a monthly status report on the deficiency corrections identified by the *Consultant*. Where deficiencies remain on the status report for a period of more than two (2) progress payment applications then without prejudice to the *Owner's* right and remedy under paragraph 2.4.4, the *Owner* may withhold an amount, as determined by the *Consultant*, from the *Contractor*, until such deficiency(ies) is/are corrected to the satisfaction of the *Owner* and *Consultant*."

.5 Add new paragraph 2.4.6 as follows:

"2.4.6 The *Contractor* shall prioritize the correction of any defective work which, in the sole discretion of the *Owner*, adversely affects the day-to-day operation of the *Owner*."

PART 3 EXECUTION OF THE WORK

GC3.4 CONTROL OF THE WORK

.1 Add a new paragraph 3.1.3 as follows:

"3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the *Contractor* shall verify, at the *Place of the Work*, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the *Work* and shall further carefully compare such field measurements and conditions with the requirements of the *Contract Documents*. Where dimensions are not included or exact locations are not apparent, the *Contractor* shall immediately notify the *Consultant* in writing and obtain written instructions from the *Consultant* before proceeding with any part of the affected *Work*."

.2 Add new paragraph 3.1.4 as follows:

"3.1.4 Once the building is occupied, the *Contractor* may be required by the *Owner*, from time to time, to suspend or alter noisy or otherwise objectionable operations should such operations cause undue interference with the *Owner's* business or activities."

GC3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

.1 Revise subparagraph 3.2.2.1 to read "The *Owner* shall provide the co-ordination of the activities of the *Owner's* forces."

.2 Delete subparagraph 3.2.3.2 and replace it with the following:

"3.2.3.2 Co-ordinate and schedule the activities and work of other contractors and *Owner's* own forces with the *Work* of the *Contractor* and connect as specified or shown in the *Contract Documents*;"

.3 Add a new subparagraph 3.2.3.5 as follows:

"3.2.3.5 Subject to GC9.4 CONSTRUCTION SAFETY, for the *Owner's* own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable Health and Safety legislation of the *Place of the Work*, including all the responsibilities of the "constructor" under OHSA."

.1 Add new paragraph 3.2.7 as follows:

"3.2.7 At the commencement of the *Work*, the *Contractor* shall prepare for the review and acceptance of the *Owner* and the *Consultant*, a schedule indicating the times, within the construction schedule referred to in GC 3.4, that items that are specified to be *Owner* purchased and *Contractor* installed or hooked up are required at the site to avoid delaying the progress of the *Work*."

GC3.4 CONSTRUCTION SCHEDULE

- .1 Delete subparagraph 3.4.1.2 and replace it with the following:
- “3.4.1.2 Provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the construction schedule referred to in paragraph 3.4.1.1 or any successor or revised schedule approved by the *Owner* pursuant to this GC3.4.”
- .2 Delete existing subparagraph 3.4.1.3 and replace it with the following:
- “3.4.1.3 Continuously monitor the progress of the *Work* and provide a monthly progress schedule covering all of the baseline activities and including the actual start, actual finish and percentage completion of those activities. Each month, the *Contractor* shall submit, for the *Owner's* approval, any changes made to the baseline logic and activity durations. The revisions to the schedule shall be graphically shown in reference to the original baseline activities.”
- .3 Add a new subparagraph 3.4.1.4 as follows:
- “3.4.1.4 if after applying the expertise and resources required under subparagraph 3.5.1, the *Contractor* forms the opinion that the slippage in schedule reported in subparagraph 3.5.3 cannot be recovered by the *Contractor*, it shall, in the same notice provided under subparagraph 3.5.3, indicate to the *Consultant* if the *Contractor* intends to apply for an extension of Contract Time as provided in PART 6 —CHANGES IN THE WORK.”
- .4 Add a new subparagraph 3.4.1.5 as follows:
- “3.4.1.5 Without limiting the other obligations of the *Contractor* under GC3.5, the *Contractor* shall not amend the baseline schedule described in subparagraph 3.5.1 without the prior written consent of the *Owner*. In addition, at each site construction meeting, the *Contractor* shall provide to the *Owner* and the *Consultant* a two (2) week look-ahead schedule indicating the major activities to be undertaken or constructed in such two (2) week period.”

GC3.5 SUPERVISION

- .1 Revise 3.5.1 as follows:
- “After “valid reason”, add “and in consultation with the *Consultant* and the *Owner*”.
- .2 Delete paragraph 3.5.2 in its entirety and replace it with the following:
- “3.5.2 The supervisor, and any project manager appointed by the *Contractor*, shall represent the *Contractor* at the Place of *Work* and shall have full authority to act on written instructions given by the *Consultant* and/or the *Owner* and the *Owner's* representative. Instructions given to the supervisor or the project manager shall be deemed to have been given to the *Contractor* and both the supervisor and any project manager shall have full authority to act on behalf of the *Contractor* and bind the *Contractor* in matters related to this Contract.”
- .3 Add new paragraphs 3.5.3, 3.5.4, 3.5.5, 3.5.6 and 3.5.7 as follows:
- “3.5.3 The *Owner*, acting reasonably, shall have the right to order the *Contractor* to remove from the *Project* any representative or employee of the *Contractor*, *Subcontractors* or *Suppliers* who, in the opinion of the *Owner*, are a detriment to the *Project*.
- 3.5.4 The supervisory staff assigned to the *Project* shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the specifications, and have a sufficient number of

years of documented Superintendent/*Project* Management experience.

- 3.5.5 The *Consultant* shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the *Project* prior to commencement of *Work*.
- 3.5.6 The *Contractor's* Supervisor shall remain on the job until the *Contract* is complete.
- 3.5.7 The *Project* Management staff assigned to the *Project* shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the specifications, and have a sufficient number of years documented Supervisor/*Project* Management experience."

GC3.6 SUBCONTRACTORS AND SUPPLIERS

- .1 Add new sentence to paragraph 3.6.2 as follows:

"The *Contractor* shall not change accepted *Subcontractors* without prior written permission of the *Owner*."

- .2 Add a new paragraph 3.6.7 as follows:

"3.6.7 Where provided in the *Contract*, the *Owner* may assign to the *Contractor*, and the *Contractor* agrees to accept, any contract procured by the *Owner* for *Work* or services required on the *Project* that has been pre-tendered or pre-negotiated by the *Owner*."

GC3.7 LABOUR AND PRODUCTS

- .1 Amend paragraph 3.7.1 by adding the words, "..., agents, Subcontractors and Suppliers. . ." after the "employees" toward the end of line one.

- .2 Also with respect to paragraph 3.7.1, add three new subparagraph which read as follows:

"3.7.1.1 The *Contractor* represents that it has sufficient skilled employees to replace, subject to the *Owner's* approval, acting reasonably, its designated supervisor and project manager in the event of death, incapacity, removal or resignation.

3.7.1.2 Without in any way limiting the generality of the foregoing, the *Contractor* shall prepare and implement the job site rules more particularly described in the tender documents. Any such job site rules prepared by the *Contractor* shall be consistent with the *Contractors* duties and obligations under the OHSA and shall also include provisions making smoking and the consumption of alcohol or non-prescription drugs on the *Project* site the subject of discipline proceedings and/or termination of employment."

- .3 Delete paragraph 3.7.3 and replace it with the following:

"*Products* shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, Ontario Building Code, National Fire Prevention Association, the Technical Standards and Safety Authority (also known as TSSA) and all governmental authorities having jurisdiction at the *Place of the Work*, unless otherwise specified. *Products* brought on to the *Place of the Work* by the *Contractor* shall be deemed to be the property of the *Owner*, but the *Owner* shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said *Product* shall be at the sole risk of the *Contractor*."

- .4 Add new paragraph 3.7.4, 3.7.5, 3.7.6, 3.7.7, 3.7.8, 3.7.9, 3.7.10, 3.7.11, 3.7.12, 3.7.13, 3.7.14, 3.7.15 and 3.7.16 as follows:

"3.7.4 The *Contractor* represents and warrants that the *Products* provided for in accordance

with the Contract are not subject to any conditional sales contract and are not subject to any security rights obtained by any third party which may subject any of the *Products* to seizure and/or removal from the *Place of the Work*."

- 3.7.5 Upon receipt of a written notice from the *Consultant*, the *Contractor* shall dismiss from the *Place of the Work* tradesmen and labourers whose *Work* is unsatisfactory to the *Consultant* or who are considered by the *Consultant* to be unskilled or otherwise objectionable.
- 3.7.6 The *Contractor* shall not employ any persons on the *Work* whose labour affiliation, or lack thereof, is incompatible with other labour employed in connection with the *Work*. Any costs arising from Labour Disputes, as a result of the employ of any such person by the *Contractor*, it's Subcontractor or *Suppliers* shall be the sole expense of the *Contractor*.
- 3.7.7 The *Contractor* shall cooperate with the *Owner* and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the *Work* at the *Place of the Work*, including cooperation to attempt to avoid *Work* stoppages, trade union jurisdictional disputes and other Labour Disputes."
- 3.7.8 Where materials or *Workmanship* are specified to comply to a standard such as a Building Code, Canadian Standards Association (CSA), Canadian General Standards Board (CGSB), or American Society for Testing and Materials (ASTM), it shall mean the latest revised edition of the standard.
- 3.7.9 *Products* which are specified by their proprietary names or by part or catalogue number shall form the basis for the specifications and tenders. No substitutes for these may be used without the *Consultant's* approval in writing. When requesting approval for the use of substitutes, the *Contractor* shall:
- .1 submit documentation proving, to the *Consultant's* satisfaction, that the substitute is equal to the specified product, and is compatible in every respect with the configuration and design of the *Project*, not requiring any change thereto to accommodate the substitution;
 - .2 provide, with each application, a list of properties of the specified product and the proposed substitute. No application to use substitutes will be considered unless made in this way;
 - .3 include in the submission any effect that the substitute may have on the *Contract Price*, and be prepared to reimburse the *Owner* for all costs that may become evident later as a result of the substitution; and
 - .4 submit requests well in advance of deadlines for ordering specified products. Substitutes will be considered only when submitted in sufficient time to permit proper investigation by the *Consultant*.
- 3.7.10 The *Contractor* shall use all *Products* in strict accordance with the manufacturers' directions except where specified otherwise. Whenever specific reference to manufacturers' directions or instructions is made in specifications, submit copies of said instructions or directions or both for approval before commencing to use such *Products*. Whenever more than one *Product* is specified for one use, the *Contractor* may select for this use any of the *Products* so specified.
- 3.7.11 Materials, appliances, equipment and other *Products* are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, Supplier or dealer is sometimes given to assist the *Contractor* to find a source Supplier. This shall not relieve the *Contractor* from his responsibility from finding his own source of supply even if the source named no longer supplies the *Product* specified. If the *Contractor* is unable to obtain the specified *Product*,

he shall supply a substitute *Product* equal to or better than the specified *Product*, as approved by the *Consultant*, with no extra compensation. Should the *Contractor* be unable to obtain a substitute *Product* equal to or superior to the specified *Product* and the *Owner* accepts an inferior *Product*, the *Contract Price* shall be adjusted accordingly, as approved by the *Consultant*.

- 3.7.12 All workmanship shall be of the highest quality performed by persons trained and skilled in accordance with best practices for each particular element of the *Work* and trade. *Provide* special workmanship and performance standards as specified."
- 3.7.13 The Foreperson of each trade engaged on the *Work* must be able to speak and understand the English language well enough to comprehend and carry out all instructions issued and to *Work* in complete co-ordination with other trades."
- 3.7.14 All deficiencies identified by *Owner* and/or *Consultants* shall be corrected promptly, and in any event within fifteen (15) days of being notified of such deficiency."
- 3.7.15 The *Owner* shall provide the *Contractor* in a timely manner with all relevant information (including storage, protection, and installation requirements) regarding *Products* to be supplied by the *Owner* or other contractors and, prior to delivery of any such *Products* to the Place of the *Work*, the *Owner* shall obtain the *Contractor's* written approval of the delivery date and proposed storage, protection and installation requirements.
- 3.7.16 Once the *Contractor* has accepted delivery of *Products*, the *Contractor* shall be responsible for the safe storage and protection of *Products* as required to avoid dangerous conditions or contamination to the *Products* or other persons or property. *Products* shall be stored in locations and at the Place of the *Work* to the satisfaction of the *Owner* and the *Consultant* as agreed and approved by the *Contractor* pursuant to paragraph 3.7.15.

Notwithstanding the foregoing, the *Contractor* shall not be responsible for any *Products* supplied by the *Owner* or other contractors unless:

- (i) the *Contract Documents* expressly stipulate that such *Product* is to be the *Contractor's* responsibility and to be installed by the *Contractor* as part of the *Work*;
- (ii) the *Contractor* has or has received from the *Owner* proof of insurance coverage sufficient, at a minimum, to cover the replacement cost of such *Product*; and
- (iii) the *Owner* obtained the *Contractor's* approval as required by paragraph 3.7.15

GC3.8 SHOP DRAWINGS

- .1 Revise the title of GC 3.8 to read "SHOP DRAWINGS AND OTHER SUBMITTALS".
- .2 Add "and *Submittals*" after the words "*Shop Drawings*" in paragraphs 3.8.1, 3.8.2, 3.8.3, 3.8.3.2, 3.8.5, 3.8.6, and 3.8.7.
- .3 Delete paragraph 3.8.2 in its entirety and replace it with new paragraph 3.8.2 as follows:

"3.8.2 Prior to the first application for payment, the *Contractor* and the *Consultant* shall jointly prepare a schedule of the dates for submission and return of *Shop Drawings* and *Submittals* in an orderly sequence."
- .4 Delete the words "with reasonable promptness so as to cause no delay in the performance of the *Work*" and replace them with the words "within 10 Working Days or such longer period as may be reasonably required" in paragraph 3.8.7.
- .5 Add new paragraph 3.8.8, 3.8.9, 3.8.10, 3.8.11, 3.8.12, 3.8.13, 3.8.14, 3.8.15, 3.8.16, 3.8.17, 3.8.18, 3.8.19, and 3.8.20 as follows:

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- "3.8.8 Prior to the first application for payment, the *Contractor* shall prepare a schedule of the dates for submission, review, and return of *Shop Drawings* and any *Submittals* as required to meet construction schedule. Schedule shall be acceptable to the *Consultant* and in accordance with paragraph 3.8.12, as amended below.
- 3.8.9 The *Consultant* will review and return Shop Drawings and Submittals in accordance with a Shop Drawing/Submittal Schedule prepared by the *Contractor* and agreed upon at the commencement of the *Work*. The *Contractor* shall allow the *Consultant* a minimum 10 *Working* days, or such longer period as may be reasonably required, to review shop drawings from the date of receipt to the date that the *Contractor* is notified that the reviewed documents are ready to be picked up. The *Contractor* shall periodically re-submit the Shop Drawing/Submittal Schedule to correspond to changes in the construction schedule and to reflect any required resubmissions. If re-submission of Shop Drawings or Submittals is required a further ten (10) day period is required for the Consultants review.
- 3.8.10 The *Contractor* shall submit *Shop Drawings* in accordance with the Shop Drawing procedures specified by Consultant.
- 3.8.11 The Consultant's review of Shop Drawings and Submittals does not relieve the Contractor of the responsibility to review all information pertaining to:
- .1 detail design;
 - .2 dimensions;
 - .3 fabrication processes;
 - .4 techniques of construction and installation; and
 - .5 coordination of the *Work* of Subcontractor."
- 3.8.12 Only Shop Drawings indicated as "Reviewed" or "Reviewed as noted" and bearing the Consultant's review date and initials, shall be used at the Place of the Work.
- 3.8.13 Reviewed Shop Drawings shall not authorize changes in cost to the Owner nor shall they authorize changes to the construction schedule.
- 3.8.14 The Contractor shall thoroughly review Shop Drawings. Where Shop Drawings are stamped but clearly not reviewed, the Consultant may reject the Shop Drawings and return them to the Contractor at the Contractor's expense.
- 3.8.15 Any fabrication Work done before receiving final reviewed Shop Drawings shall be at the Contractor's and his Subcontractor's and/or Supplier's risk.
- 3.8.16 Reviewed Shop Drawings shall not authorize a change in the Contract Price and/or the Contract Time.
- 3.8.17 The Contractor shall prepare a Shop Drawings schedule acceptable to the Owner and the Consultant prior to the first application for payment. A draft of the proposed Shop Drawings schedule shall be submitted by the Contractor to the Consultant and the Owner for approval. The draft Shop Drawings schedule shall clearly indicate the phasing of Shop Drawings submissions.
- 3.8.18 Except where the parties have agreed to a different Shop Drawings schedule pursuant to paragraph 3.10.3, the Contractor shall comply with the requirements for Shop Drawings submissions stated in the Specifications, Section 01300, Submittals.
- 3.8.19 The Contractor shall not use the term "by others" on Shop Drawings or other Submittals. The related trade, Subcontractor or Supplier shall be stated.

- 3.8.20 Certain Specifications sections require the Shop Drawings to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the Place of the Work and shall have expertise in the area of practice reflected in the Shop Drawings."

GC3.9 PERFORMANCE BY CONTRACTOR

- .1 Add new General Condition 3.9.

"3.9 PERFORMANCE BY CONTRACTOR

- 3.9.1 In performing its services and obligations under the Contract, the Contractor shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The Contractor acknowledges and agrees that throughout the Contract, the Contractor's obligations, duties and responsibilities shall be interpreted in accordance with this standard. The Contractor shall exercise the same standard of due care and diligence in respect of any Products, personnel, or procedures which it may recommend to the Owner.
- 3.9.2 The Contractor further represents, covenants and warrants to the Owner that:
- .1 The personnel it assigns to the Project are appropriately experienced;
 - .2 It has a sufficient staff of qualified and competent personnel to replace its designated supervisor and project manager, subject to the Owner's approval, in the event of death, incapacity, removal or resignation.
 - .3 There are no pending, threatened or anticipated claims, liabilities or actions involving the Contractor, the outcome of which may have a material adverse effect on the financial ability of the Contractor to complete the Work. "

GC3.10 CONTRACTOR USE OF PERMANENT EQUIPMENT OR SYSTEMS

- .1 Add a new General Condition 3.10 as follows:

"3.10 CONTRACTOR USE OF PERMANENT EQUIPMENT OR SYSTEMS

- 3.10.1 With the prior written approval of the Owner, the Contractor may make use of elements of the mechanical and electrical systems or equipment comprising a permanent part of the Work for the purpose of providing heat or power to the Project during the final stages of construction. In such event, and before the issuance of the certificate of Substantial Performance of the Work, the Contractor shall clean and make good, to the satisfaction of the Consultant, such systems and equipment as it had been permitted to use. The Contractor shall pay any and all costs associated with such use, cleaning and making good."

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCE

- .1 Add the following to 4.1.1:

"Unless notified otherwise, Cash allowances cover the net cost to the Contractor of services, Products, labour, materials, construction machinery and equipment, freight, unloading, handling, storage, installation, and other authorized expenses incurred in performing the Work stipulated under the cash allowances including duties and applicable taxes but not including HST."

- .2 Add the following to 4.1.2:

"HST applicable to cash allowances is included in the total amount payable, set out in Article A-4.3."

- .3 Add new sentence to end of paragraph 4.1.4 as follows:

"The maximum mark-up on authorized overrun on cash allowances shall be ten per cent (10%)."

- .4 Delete the current text of paragraph 4.1.7 and replace with the following:

"4.1.7 At the commencement of the *Work*, the *Contractor* shall prepare for the review and acceptance of the *Owner* and the *Consultant*, a schedule indicating the times, within the construction schedule referred to in GC 3.5, that items called for under cash allowances, and items that are specified to be *Owner* purchased and *Contractor* installed or hooked up, are required to be ordered and delivered to the site to avoid delaying the progress of the *Work*."

- .6 Add new paragraph 4.1.8 as follows:

"4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for competitive bids for portions of the *Work*, to be paid for from cash allowances."

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- .1 Delete GC5.1 in its entirety and replace it with "Intentionally left blank."

GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Amend paragraph 5.2.3 by adding the following to the end of that paragraph:
"No amount claimed shall include *Products* delivered to the *Place of the Work* unless the *Products* are free and clear of all security interest, liens, and other claims of third parties."

- .2 Amend paragraph 5.2.4 by adding the following to the end of that paragraph:

"Such statement of values shall subdivide the *Contractor's* allocation for "general conditions" to identify a separate line item labeled "allocation for baseline schedule required by GC3.4." The allocation to such line item shall be calculated as follows:

- .1 where the *Contract Price* is \$2,000,000 or less, the greater of \$5,000 or 5% of the total amount allocated by the *Contractor* to "general conditions;
- .2 where the *Contract Price* is greater than \$2,000,000, the sum of \$12,000.

In addition, the statement of values shall identify a separate line item labeled "allocation for warranty obligations described in GC12.3". The allocation to such line item shall be 0.30% of Stipulated Sum Price"

- .3 Delete the word "first" in paragraph 5.2.7 and replace it with the word "second."

- .4 Amend paragraph 5.2.8 by adding the following new sentence at the end of that paragraph:

"Any *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall remain at the risk of the *Contractor* notwithstanding the title has passed to the *Owner* pursuant to GC13.1 OWNERSHIP OF MATERIALS."

- .5 Add new paragraphs 5.2.9, 5.2.10, 5.2.11, 5.2.12 and 5.2.13 as follows:

"5.2.9 The *Contractor* shall submit, with each application for progress payment after the first, a Statutory Declaration, on an original form of CCDC Document 9A-2001, stating that all accounts for labour, subcontracts, *Products*, Construction Equipment and other

indebtedness which may have been incurred by the *Contractor* and for which the *Owner* might in any way be held responsible have been paid in full up to the previous invoice, except for amounts properly retained as a holdback or as an identified amount in dispute.

- 5.2.10 The *Contractor* shall submit *Workplace Safety & Insurance Board Clearance Certificate*, and a *Statutory Declaration (CCDC 9A-2001)* with each application for progress payment.
- 5.2.11 The *Contractor* shall prepare and maintain current as-built *Drawings* which shall consist of the *Drawings* and *Specifications* revised by the *Contractor* during the *Work*, showing changes to the *Drawings* and *Specifications*, which current as-built *Drawings* shall be maintained by the *Contractor* and made available to the *Consultant* for review with each application for progress payment. The *Consultant* reserves the right to retain a reasonable amount for the value of the as-built *Drawings* not presented for review."
- 5.2.12 Prior to each application for payment, the *Contractor*, *Consultant* and subconsultants shall jointly check the progress of the *Work* at the site."
- 5.2.13 Seven (7) calendar days prior to issuance of each proper invoice, the contractor shall issue an updated schedule of values for review by the consultant."

GC5.3 PROGRESS PAYMENTS

- .1 Add new paragraphs 5.3.3, and 5.3.4, as follows:

- "5.3.3 In the event a construction lien is registered against the *Place of the Work* in circumstances where the *Owner* is not in breach of its payment obligations under this *Contract*, then the *Contractor* shall, within seven (7) days of receiving notice of the construction lien, have the lien removed by way of discharge, settlement, or by posting security to vacate the registration of the lien. In the event that the *Contractor* fails to see to the removal of the construction lien, then without prejudice to any other right or remedy it may have, the *Owner* may see to the removal of the construction lien by payment into court or otherwise, and the costs of so doing shall be to the *Contractor's* account.
- 5.3.4 All progress payments are not conclusive as to the value or quality of services provided and are subject to further evaluation and readjustment on future and final progress payments. The submission of monthly draw amounts by the *Contractor* and *Subcontractors* must reflect accurate valuations for *Work* completed and installed. The *Contractor* shall review and evaluate all *Subcontractors Work* and be responsible for verifying the monthly draw amounts claimed.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

- .1 Delete all paragraphs of GC 5.4 in their entirety and replace them with the following paragraphs:

- "5.4.1 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, within five (5) Working Days, deliver to the Consultant and to the Owner a comprehensive list of items to be completed or corrected, together with a written application 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.
- 5.4.2 The Consultant will review the Work to certify or verify the validity of the application and shall promptly, and in any event, no later than 10 calendar days after receipt of the Contractor's application:
 - .1 advise the Contractor in writing that the Work or the designated portion of the Work is not substantially performed and give reasons why, or

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- .2 state the date of Substantial Performance of the Work or a designated portion of the Work in a certificate and issue a copy of that certificate to each of the Owner and the Contractor.
- 5.4.3 Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the Owner shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the Place of the Work, place the holdback amount in a bank account in the joint names of the Owner and the Contractor.
- 5.4.4 Subject to the requirements of any Payment Legislation, all holdback amounts prescribed by the applicable lien legislation for the Place of the Work shall become due and payable to the Contractor no later than 10 Working Days following the expiration of the holdback period stipulated in the lien legislation applicable to the Place of the Work, as certified or verified by the Consultant when permitted by any Payment Legislation.
- 5.4.5 The Contractor shall submit an application for release of the lien holdback amount in accordance with the lien legislation applicable to the Place of the Work. Except to the extent required by any Payment Legislation, such application for release of the holdback shall not constitute an application for payment that is subject to Proper Invoice requirements.
- 5.4.6 Where legislation permits progressive release of the holdback for a portion of the Work and the Consultant has certified or verified that the part of the Work has been performed prior to Substantial Performance of the Work, the Owner hereby agrees to release, and shall release the holdback for such portion of the Work to the Contractor in accordance with such legislation.
- 5.4.7 Notwithstanding any progressive release of the holdback, the Contractor shall ensure that such parts of the Work are protected pending the issuance of a final certificate for payment or until the Owner takes early occupancy in accordance with GC12.2, whichever comes first, and shall be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released.
- 5.4.8 Immediately following the issuance of a certificate of Substantial Performance of the Work, the Contractor shall publish the Certificate in the manner provided in the Act failing which publication, the Owner shall be at liberty to publish and back charge the Contractor for its reasonable costs for doing so."
- 5.4.9 The *Contractor* acknowledges that the *Submittals* described in this paragraph 5.4.4 are critical to the Owner's use, occupancy and maintenance of the *Project* and agrees to make such *Submittals* to the Owner, before or after applying for the payment described in paragraph 5.4.1, as follows:
- .1 submit to the *Consultant*, with its application for payment, all written guarantees, warranties, certificates, testing and balancing reports, distribution system diagrams, *Shop Drawings*, maintenance and operating instructions, spare parts, maintenance manuals and materials and any other materials or documentation required by the *Contractor*, except for record drawings;
- .2 with respect to as built drawings, the *Contractor* shall submit full and complete as-built drawings to the *Consultant* within forty-five (45) days of the issuance of the certificate of Substantial Performance of the *Work* and the *Owner* shall be at liberty to withhold from amounts otherwise payable to the *Contractor* the sum of \$15,000.00 as security for the obligation of the *Contractor* to deliver such as built drawings."

GC5.5 FINAL PAYMENT

- .1 Add to the end of paragraph 5.5.1 the following sentence:
- “The application for final payment shall meet the requirements of a Proper Invoice.”
- .2 Add the following to the end of paragraph 5.5.3:
- “Subject to any Payment Legislation, when the Consultant finds the Contractor's application for final payment to be not valid, the Contractor shall revise and resubmit the application when the Contractor has addressed the reasons given by the Consultant.
- .3 Amend paragraph 5.5.4, by delete the words “5” with “15”. In the same paragraph added the following words to the end of the paragraph, “..and as per the Construction Act”.

PART 6 CHANGES IN THE WORK

GC6.1 OWNER'S RIGHT TO MAKE CHANGES

- .1 Amend paragraph 6.1.2 by adding the following to the end of that paragraph:
- “This requirement is of the essence and it is the express intention of the parties that any claims by the *Contractor* for a change in the *Contract Price* and/or *Contract Time* shall be barred unless there has been strict compliance with PART VI CHANGES IN THE WORK. No course of conduct or dealing between the parties, no express or implied acceptance of alterations or additions to the *Work* and no claims that the *Owner* has been unjustly enriched by any alteration or addition to the *Work*, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this Contract or a claim for any extension of the *Contract Time*.”
- .2 Add new paragraphs 6.1.3, 6.1.4, 6.1.5 and 6.1.6 as follows:
- “6.1.3 The Contractor agrees that coordination costs facilitated through Cash Allowance Directives including but not limited to site surface conditions, work by Contractor own forces, site coordination, coordination of sub-contractors and suppliers are included in the *Contract Price*.”
- 6.1.4 *Change Orders* and *Change Directives* shall be numbered sequentially as issued and independent of the numbering sequence for Notices of Contemplated Change. A group of Notices of Contemplated Change may be appropriately combined for the issuance of *Change Orders* or *Change Directives*.
- 6.1.5 No extension to *Contract Time* shall be granted for changes in the *Work* unless the *Contractor* provides prior written notice regarding the anticipated delay and can clearly demonstrate that such changes will materially alter the overall construction schedule submitted at the commencement of the *Work*.
- 6.1.6 The *Contractor* shall keep informed all Insurance or Surety Company or Companies who have issued Performance Bonds, Liability Insurance and Property Insurance for this *Contract*, of all material changes to the *Contract*. If a change to the *Contract* requires an adjustment of the bonds or insurance, the *Contractor* shall, subject to approval by the *Consultant* and the *Owner* and in a timely manner, initiate and pay for such adjustments on behalf of the *Owner* and a *Change Order* will be issued by the *Consultant*, to reimburse the *Contractor*.”

GC6.2 CHANGE ORDER

- .1 Add new paragraph 6.2.3 as follows:
- “6.2.3 The value of a change shall be determined in one or more of the following methods as

directed by the Owner:

- .1 by unit prices established in the Contract or subsequently agreed upon. Unit Prices shall include overhead, profit, and other reasonable charges of the *Contractor* and shall be the total cost to the Owner. Adjustment to the *Contract Price* shall be based on a net quantity difference from the original quantity.
- .2 by the amount, net of all credits, of time, materials and *Products* expended:
 - (1) by a Subcontractor applying the labour charge out rates set out in the wage schedule in the *Contract Documents* together with the actual costs, of materials and *Products* without mark-up utilized in the change, plus the Subcontractor's mark-up disclosed in the table below which applies to material and *Product* costs only;
 - (2) the *Contractor* shall be entitled to the *Contractor* mark-up in the table below on the value of Subcontractor *Work*

Change in the <i>Contract Price</i>	Subcontractor Mark-Up (%) (includes overhead and profit)	Contractor Mark-Up (%) On Subcontractor <i>Work</i> (includes overhead and profit)
\$0 to no more than \$10,000	10	10
\$10,001 to no more than \$20,000	10	5
\$20,001 or more	5	5

Interpretive Note: The mark-ups disclosed in the above table are flat not graduated.

- .3 where the *Contractor* self performs a change, it shall be entitled to the mark-ups described in the "Subcontractor Mark-Up (%)".
 - .4 the mark-ups described in paragraph 6.2.3.2 include all necessary overhead and profit, head office, wages, of site superintendent and project manager, coordination, administrative personnel, site office, telecommunications, insurance, time required to estimate change, extension of schedule, supervision, travel, accommodations, subsistence, general account items, general clean-up, small tools, as-built drawings and job safety necessary to perform the change."
 - .5 Labour rates will be negotiated and agreed between the owner and the contractor prior to the submission of the first charge in the work. Labour rates will be evaluated for fair value and will not include profit. Profit is to be applied as per table above. Labour rates include salary, benefits and overhead.
- .2 The signing of a *Change Order* by all parties shall be deemed to be formal acceptance by the *Owner* of the *Contractor's* quotation.

GC 6.3 CHANGE DIRECTIVE

- .1 Further amend paragraph 6.3.6.3 by adding the following to the end of that paragraph:

"Such allowance for overhead and profit shall be as described in paragraphs 6.2.3.3 and 6.2.3.4."

- .2 Delete the contents of item 6.3.7 entirely and add new 6.3.7 as follows:
"6.3.7 The cost of performing the *Work* attributable to the *Change Directive* shall be valued as specified for valuation of *Change Orders*. Refer to GC6.2, CHANGE ORDERS
- .3 Revise item 6.3.11 to read as follows:
"6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as a result of the *Change Directive* may be issued as a *Change Order*, which may then be included in the progress payments."

GC6.4 CONCEALED OR UNKNOWN CONDITIONS

- .1 Delete paragraph 6.4.1.1 and 6.4.1.2 and replace it with the following:
"6.4.1.1 The *Contractor* confirms that, prior to tendering the *Project*, it carefully investigated the *Place of the Work* and applied to that investigation the degree of care and skill described in paragraph 3.11.1, given the amount of time provided between the issue of tender documents and the actual closing of tenders.
6.4.1.2 If the *Contractor* has not conducted such careful investigation, it is deemed to assume all risk of conditions or circumstances now existing or arising in the course of the *Work* which could make the *Work* more expensive or more difficult to perform than was contemplated at the time the Contract was executed. No claim by the *Contractor* will be entertained in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the Contract."
- .2 Amend paragraph 6.4.2 by adding a new first sentence which reads as follows:
"6.4.2 Having regard to paragraph 6.4.1, if the *Contractor* believes that the conditions of the *Place of the Work* differ materially from those reasonably anticipated, differ materially from those indicated in the *Contract Documents* or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall notify the *Owner* and *Consultant* in writing no later than five (5) *Working Days* after the first observation of such conditions."
- .3 Amend the existing second sentence of paragraph 6.4.2, in the second line, following the word "materially" by adding the words "or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1."
- .4 Delete paragraph 6.4.3 and substitute the following:
"6.4.3 If the *Consultant* makes a finding pursuant to paragraph 6.4.2 that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* shall report in writing the reasons for this finding to the *Owner* and the *Contractor*."
- .5 Add new paragraph 6.4.5:
6.4.5 The *Contractor* confirms that, prior to bidding the *Project*, it carefully reviewed the *Place of the Work* and applied to that review the degree of care and skill described in paragraph 3.9.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the *Contractor* prior to submission of bid, and the sufficiency and completeness of the information provided by the *Owner*. The *Contractor* is not entitled to compensation or to an extension of the *Contract Time* for conditions which could reasonably have been ascertained by the *Contractor* by such review undertaken in accordance with this paragraph 6.4.5.

GC 6.5 DELAYS

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- .1 Amend paragraph 6.5.1 as follows:
- .1 In the third line after the words "in consultation with the *Contractor*", add "and as accepted in writing by the *Owner*."
- .2 Delete the period at the end of paragraph 6.5.1, and add the following words at the end of the sentence: ", but excluding any consequential, indirect or special damages."
- .2 Amend paragraph 6.5.2 as follows:
- .1 by deleting all of the words in the fifth line following the word "for" and substituting the following:
".....reasonable direct costs directly flowing from the delay but excluding any consequential, indirect or special damages."
- .2 In the fourth line after the words "in consultation with the *Contractor*", add "and as accepted in writing by the *Owner*."
- .3 Amend paragraph 6.5.3 as follows:
- In the ninth line after the words "the *Contractor*", delete the period and add "and as accepted in writing by the *Owner*."
- .4 Amend paragraph 6.5.4 as follows:
- In the first line after the words "to the *Consultant*", add "and accepted in writing by *Owner*".
- .5 Add new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows:
- "6.5.6 If the *Contractor* is delayed in the performance of the *Work* by an act or omission of the *Contractor* or anyone employed or engaged by the *Contractor* directly or indirectly, or by any cause within the *Contractor's* control, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may decide in consultation with the *Contractor*. The *Owner* shall be reimbursed by the *Contractor* for all reasonable costs incurred by the *Owner* as the result of such delay, including all services required by the *Owner* from the *Consultant* as a result of such delay by the *Contractor* and, in particular, the cost of the *Consultant's* services during the period between the date of *Substantial Performance of the Work* stated in Article A-1 herein as the same may be extended through the provisions of these General Conditions and any later, actual date of *Substantial Performance of the Work* achieved by the *Contractor*.
- 6.5.7 The *Contractor* shall be responsible for the care, maintenance and protection of the *Work* in the event of any suspension of construction as a result of the delay described in paragraph 6.5.1, 6.5.2 or 6.5.3. In the event of such suspension, the *Contractor* shall be reimbursed by the *Owner* for the reasonable costs incurred by the *Contractor* for such protection, but excluding the costs of the *Contractor's* head office personnel, for such care, maintenance and protection. The *Contractor's* entitlement to costs pursuant to this paragraph 6.5.6, if any, shall be in addition to amounts, if any, to which the *Contractor* is entitled pursuant to paragraph 6.5.1, 6.5.2 or 6.5.3.
- 6.5.8 Without limiting the obligations of the *Contractor* described in GC3.2 or GC9.4, the *Owner* may, by notice in writing, direct the *Contractor* to stop the *Work* where the *Owner* determines that there is an imminent risk to the safety of persons or property at the Place of *Work*. In the event that the *Contractor* receives such notice, it shall immediately stop the *Work* and secure the site. The *Contractor* shall not be entitled to an extension of the *Contract Time* or to an increase in the *Contract Price* unless the resulting delay, if any, would entitle the *Contractor* to an extension of the *Contract Time* or the reimbursement of

the *Contractor's* costs as provided in paragraph 6.5.1, 6.5.2 or 6.5.3."

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

- .1 Add the words "as noted in paragraph 6.6.3" after the words "of the claim" in paragraph 6.6.5 and add the words "and the consultant", at the end of paragraph 6.6.5.

PART 7 DEFAULT NOTICE

GC7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

- .1 Amend paragraph 7.1.2 by adding the words ".....or fails or neglects to maintain the latest schedule provided pursuant to GC3.5...". Immediately following the word "properly" in line one.
- .2 Add the following to paragraph 7.1.1:
- "A duplicate of this notice shall be simultaneously sent to the *Consultant*."
- .3 Add the word "and" at the end of sentence 7.1.5.1, and 7.1.5.2.
- .4 Add the following to paragraph 7.1.6:
- "If the *Owner* proceeds to correct a default, as provided in paragraph 7.1.4.1, when the *Contractor* has failed to correct the default within the time period specified or otherwise agreed to in writing, the *Owner* may arrange for correction of such *Work* by other forces without further notice. The cost of such *Work* shall be deducted from the *Contract Price* regardless of whether the *Work* has previously been certified for payment."

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

- .1 Add the following to paragraph 7.2.1:
- "A duplicate of this notice shall be sent simultaneously to the *Consultant*."
- .2 Amend paragraph 7.2.2, in line 1, by deleting "20 *Working Days*" and replacing it with "40 Working days".
- .3 Delete paragraph 7.2.3.1 and replace it with "Intentionally left blank".
- .4 Delete paragraph 7.2.3.3 and replace it with the following:
- "7.2.3.3 The *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by arbitration or a Court, except where the *Owner* has a *bona fide* claim for setoff, or..."
- .5 Amend paragraph 7.2.3.4 by deleting the comma toward the end of the first line. Further amend paragraph 7.2.3.4 by deleting the phrase beginning with the word "except" and ending with the word "Owner"
- .6 Amend 7.2.4 as follows:
In the second line, delete "5 *Working Days*" and replace with "10 *Working Days*".
- .7 Add the following to paragraph 7.2.5 as follows:
- "7.2.5 If the default cannot be corrected within the ten *Working Days* specified in paragraph 7.2.4, the *Owner* shall be deemed to have cured the default if it:
- .1 commences correction of the default within the specified time;
 - .2 provides the *Contractor* with an acceptable schedule for such correction; and

- .3 completes the correction in accordance with such schedule.”
- .8 Amend paragraph 7.2.5 as follows:
- Delete the words “and such other damages as the *Contractor* may have sustained as the result of the termination of the *Contract*.”
- .9 Delete renumbered paragraph 7.2.6 in its entirety and replace it with the following:
- “7.2.6 If the *Contractor* terminates the Contract under the conditions described in this GC7.2, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of termination. The *Contractor* shall also be entitled to recover the direct costs associated with termination, including the costs of demobilization, losses sustained on *Products* and construction machinery and equipment. The *Contractor* shall not be entitled to any recovery for any special, indirect or consequential losses.”
- .10 Add paragraph 7.2.7 and 7.2.8 as follows:
- “7.2.7 If the *Contractor* stops the *Work* or terminates the *Contract* in accordance with the paragraphs above, he shall leave the site and the *Work* in a secure condition as required by jurisdictional authorities and the *Contract Documents*.
- 7.2.8 The provisions of this GC 7.2 shall not apply to the withholding of certificates and/or payments because of the *Contractor's* failure to pay all just claims promptly, or because of the registration of a lien against the *Place of the Work*, nor shall they apply to the *Owner's* withholding and set-off under paragraphs 5.8.2 and 5.8.3 and the deduction of monies to cover costs incurred in correcting deficiencies as provided in GC 7.1 above.”

PART 8 DISPUTE RESOLUTION

GC 8.2 ADJUDICATION

- .1 Delete the word “prescribed” from paragraph 8.2.1 and substitute the words “provided for”.

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

- .1 Add the following new paragraphs 8.3.9 to 8.3.13:
- “8.3.9 Within five days of receipt of the notice of arbitration by the responding party under paragraph 8.3.6, the Owner and the Contractor shall give the Consultant a written notice containing:
- .1 a copy of the notice of arbitration;
- .2 a copy of supplementary conditions 8.3.9 to 8.3.14 of this Contract, and;
- .3 any claims or issues which the Contractor or the Owner, as the case may be, wishes to raise in relation to the Consultant arising out of the issues in dispute in the arbitration.”
- 8.3.10 The Owner and the Contractor agree that the Consultant may elect, within ten days of receipt of the notice under paragraph 8.3.9, to become a full party to the arbitration under paragraph 8.3.6 if the Consultant:
- .1 has a vested or contingent financial interest in the outcome of the arbitration;
- .2 gives the notice of election to the Owner and the Contractor before the arbitrator is appointed;
- .3 agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.3.6, and,
- .4 agrees to be bound by the arbitral award made in the arbitration.
- 8.3.11 Without limiting and subject to the Owner and Contractor's rights under paragraph 8.3.12

to challenge whether the Consultant has satisfied the requirements of paragraph 8.3.10, if an election is made under paragraph 8.3.10:

- .1 the Owner or Contractor may request particulars and evidence of the Consultant's vested or contingent financial interest in the outcome of the arbitration;
- .2 the Consultant shall participate in the appointment of the arbitrator; and,
- .3 notwithstanding the rules referred to in paragraph 8.3.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration.

8.3.12 The arbitrator in the arbitration in which the Consultant has elected under paragraph 8.3.10 to become a full party may:

- .1 on application of the Owner or the Contractor, determine whether the Consultant has satisfied the requirements of paragraph 8.3.10, and;
- .2 make any procedural order considered necessary to facilitate the addition of the Consultant as a party to the arbitration.

8.3.13 The provisions of paragraph 8.3.9 shall apply (with all appropriate changes being made) to written notice to be given by the Consultant to any sub-consultant."

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

- .1 Delete subparagraph 9.1.1.1 in its entirety and substitute new subparagraph 9.1.1.1:

"9.1.1.1 errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.14.1; "

- .2 Delete paragraph 9.1.2 in its entirety and substitute the following new paragraph 9.1.2:

"9.1.2 Before commencing any Work, the Contractor shall determine the locations of all underground utilities and structures indicated in the Contract Documents, or that are discoverable by applying to an Inspection of the Place of the Work exercising the degree of care and skill described in paragraph 3.14.1."

- .3 Add a new paragraph 9.1.5 as follows:

"9.1.5 Without in any way limiting the *Contractor's* obligations under this GC9.1, should the *Contractor* or any Subcontractor or Supplier cause loss or damage to trees or other plantings, whether owned by the *Owner* or third parties, the *Contractor* shall be liable for the replacement cost of the trees or other plantings damaged, including the cost of any arborist or other *Consultant*, and such costs may be deducted by the *Owner* from amounts otherwise owing to the *Contractor*."

GC9.2 TOXIC AND HAZARDOUS SUBSTANCES

- .1 Add a new paragraph 9.2.5.5 as follows:

"5 In addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials."

- .2 Add the following to paragraph 9.2.6 after the word "responsible" in line two:

"...or whether any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory

requirements, or which threatens human health and safety or the environment, or material damage to the property of the *Owner* or others,

.3 Add the words “and the Consultant” after the word “Contractor” in subparagraph 9.2.7.4.

.4 Amend paragraph 9.2.8 by adding the following after the word “responsible” in line two:

“...or that any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the *Owner* or others,.”

.5 Add a new paragraph 9.2.10 as follows:

“9.2.10 Without limiting its other obligations under this GC9.2, the *Contractor* acknowledges that its obligations under the Contract include compliance with the Environmental Programs, including, but not limited to, the Asbestos Abatement Program. The *Contractor* acknowledges that the *Owner* may suffer loss and damage should the *Contractor* fail to comply with the Environmental Programs and agrees to indemnify and hold harmless the *Owner* with respect to any loss or damage to which the *Owner* is exposed by the *Contractor's* failure to comply. The *Contractor* expressly agrees that such loss and damage shall be included within the scope of the *Contractor's* indemnity described in paragraph 12.1.1 of the General Conditions. The *Contractor* acknowledges that should it fail to comply with the Environmental Program, such failure will constitute a failure to comply with the Contract to a substantial degree within the meaning of paragraph 7.1.2.”

GC9.4 CONSTRUCTION SAFETY

.1 Delete paragraph 9.4.1 in its entirety and replace it with the following:

“9.4.1 The *Contractor* shall be solely responsible for construction safety at the *Place of 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*.”

.2 Add new paragraphs 9.4.6, 9.4.7, 9.4.8, 9.4.9, and 9.4.10 as follows:

“9.4.6 Prior to the commencement of the *Work*, the *Contractor* shall submit to the *Owner*:

- .1 a current WSIB clearance certificate;
- .2 copies of the *Contractor's* insurance policies having application to the *Project* or certificates of insurance, at the option of the *Owner*;
- .3 documentation of the *Contractor's* in-house safety-related programs;
- .4 a copy of the Notice of *Project* filed with the Ministry of Labour naming itself as “constructor” under OHSA.

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

9.4.8 The *Owner* undertakes to include in its contracts with other contractors and/or in its

instructions to its own forces the requirement that the other contractor or own forces, as the case may be, will comply with directions and instructions from the *Contractor* with respect to occupational health and safety and related matters. The text of such instruction is attached to these Supplementary Conditions as Appendix 1.

9.4.9 The Contractor shall file a "Notice of Project" with the Ontario Ministry of Labour as Constructor of this project as required under Part III of The Occupational Health and Safety Act, and provide the Owner with a copy of such notice.

9.4.10 The Contractor agrees that its designation as constructor for the Project extends to circumstances where the Owner performs work with its own forces or with other Contractors. The Owner agrees that if it does perform work with its own forces or with other Contractors that the Owner will contractually require its own forces and such other Contractors to follow the directions, instructions, rules and regulations of the Contractor in respect of all matters relating to health and safety. "

GC9.5 MOULD

.1 Add "and the Consultant" after "Contractor" in subparagraph 9.5.3.4.

.2 Delete paragraph 9.5.3.3 in its entirety and replace it with the following:

"9.5.3.3 Extend the *Contract Time* for such reasonable time as the *Consultant* may recommend on consultation with the Contractor and the *Owner*. If, in the opinion of the Consultant, the *Contractor* has been delayed in performing the *Work* and/or has incurred additional costs under paragraph 9.5.1.2, the *Owner* shall reimburse the *Contractor* for the reasonable costs incurred as a result of the delay and as a result of taking those steps, and..."

GC 9.6 OCCUPANCY PRIOR TO SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Add new General Condition 9.6 - OCCUPANCY PRIOR TO SUBSTANTIAL PERFORMANCE OF THE WORK

.2 Add new paragraphs 9.6.1 through 9.6.4, as follows:

9.6.1 The *Owner*, its agents, and other *Contractors* shall have the right to enter upon, and the *Owner* shall have the right to take possession of, the *Work* in whole or in part for the purpose of placing fittings and equipment or for other use before the substantial completion of the *Contract*, if, in the opinion of the *Consultant*, such entry and taking possession does not prevent or unreasonably interfere with the *Contractor's Work* to complete the *Work* within the time specified. Such entry and taking possession shall not be considered as acceptance of the *Work* nor in any way shall it relieve the *Contractor* of his responsibility to complete the *Contract*.

9.6.2 The *Contractor* shall, as directed by the *Consultant* to give priority to certain parts of the *Work* and bring such parts to a "ready for use" status. Such instructions may require installation of temporary stairs and exits and temporary services, all of which shall be provided and subsequently removed.

9.6.3 The *Contractor* shall maintain full access to the building for the *Owner's* use, as required. The *Contractor* shall maintain or restore heat and power to the above areas when necessary or as scheduled and keep existing utilities and services functional.

9.6.4 The *Contractor* shall keep informed all Insurance or Surety Company or Companies who have issued Performance Bonds, Liability Insurance and Property Insurance for this *Contract*, of the extent of the occupancy. If the occupancy by the *Owner* requires adjustments of the bonds, or insurances, the *Contractor* shall, subject to the *Owner's*

approval, initiate and pay for such adjustments on behalf of the *Owner* and a *Change Order* will be issued.”

PART 10 GOVERNING REGULATIONS

GC10.1 TAXES AND DUTIES

- .1 Amend paragraph 10.1.2 by adding the following sentence at the end of the existing paragraph:

“For greater certainty, the *Contractor* shall not be entitled to any mark up for overhead or profit on any increase in such taxes and duties and the *Owner* shall not be entitled to any credit relating to mark up for overhead or profit on any decrease in such taxes.”

- .2 Add new paragraphs 10.1.3, 10.1.4, 10.1.5 and 10.1.6 as follows:

“10.1.3 Where an exemption or a recovery of sales taxes, customs duties, excise taxes or Value Added Taxes is applicable to the Contract, the *Contractor* shall, at the request of the *Owner* or the *Owner's* representative, assist, join in, or make application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the *Owner*. The *Contractor* agrees to endorse over the *Owner* any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph 10.1.3.

10.1.4 The *Contractor* shall maintain accurate records tabulating equipment, material and component costs reflecting the taxes, customs duties, excise taxes and Value Added Taxes paid.

10.1.5 Any refund of taxes, including without limitation, any government sales tax, customs duty, excise tax or Value Added Tax, whether or not paid, which is found to be inapplicable or for which exemption may be obtained, is the sole and exclusive property of the *Owner*. The *Contractor* agrees to cooperate with the *Owner* and to obtain from all *Subcontractors* and *Suppliers* cooperation with the *Owner* in the application for any refund of any taxes, which cooperation shall include, but not be limited to, making or concurring in the making of an application for any such refund or exemption and providing to the *Owner* copies, or where required, originals of records, invoices, purchase orders and other documentation necessary to support such applications or exemptions or refunds. All such refunds shall either be paid to the *Owner*, or shall be a credit to the *Owner* against the *Contract Price*, in the *Owner's* discretion.

10.1.6 Customs duties penalties, or any other penalty, fine or assessment levied against the *Contractor* shall not be treated as a tax or customs duty for purposes of this GC 10.1”.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- .1 Delete from the first line of paragraph 10.2.5 the word, “The” and substitute the words: “Subject to paragraph 3.9.1, the”.

- .2 Further amend paragraph 10.2.5 by adding the following to the end of the second sentence:

“...and no further *Work* on the affected components of the Contract shall proceed until these changes to the *Contract Documents* have been obtained by the *Contractor* from the *Consultant*.”

- .3 Further amend paragraph 10.2.5 by adding the following sentence to the end of the paragraph, as amended:

“The *Contractor* shall notify the Chief Building Official or the registered code agency where applicable, of the readiness, substantial completion, and completion of the stages of construction set out in the Ontario Building Code. The *Contractor* shall be present at each site inspection by an

inspector or registered code agency as applicable under the Ontario Building Code.”

- .4 Amend paragraph 10.2.6 by adding the following sentence at the end of that paragraph:

“In the event the *Owner* suffers loss or damage as a result of the *Contractor's* failure to comply with paragraph 10.2.5, and notwithstanding any limitations described in paragraph 12.1.1, the *Contractor* agrees to indemnify and to hold harmless the *Owner* and the *Consultant* from and against any claims, demands, losses, costs, damages, actions, suits or proceedings resulting from such failure by the *Contractor*.”

- .5 Add new paragraph 10.2.8 and 10.2.9 as follows:

“10.2.8 The “Building Permit Copy” of the drawings and specifications as approved by the Chief Building Official and issued as part of the Building Permit shall be reviewed by the *Consultant* for any requirements which could affect the *Contract Documents*. It shall then be kept on the job and maintained in good condition from commencement to completion of the *Work*. On completion of the *Work*, this Building Permit copy shall be delivered in good condition to the *Consultant*.”

10.2.9 The *Contractor* shall pay any Municipal security deposits required by the Authorities as a condition of the issuance of the Building Permit. The *Contractor* shall be responsible for removing mud and other debris that accumulates on the public street during construction. If the *Contractor* does not comply with notification from the Municipality to clean the affected street within twenty-four (24) hours, then the Municipal Public Works Department shall have the right to clean the affected street at the sole expense of the *Contractor*”.

GC 10.4 WORKERS' COMPENSATION

- .1 Amend paragraph 10.4.1 so that, as amended, it reads as follows:

“Prior to commencing the *Work*, and with each application for payment thereafter, the *Contractor* shall provide a Clearance Certificate from WSIB.”

- .2 Add new paragraph as follows:

“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 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

- .1 After the second occurrence of the term “*Ready-for-Takeover*” insert before the term “*Ready- for-Takeover*” in paragraph 12.1.3 the words “*determination of*”.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

- .1 Delete the word “achieve” in paragraph 12.2.4 and replace it with the words “have achieved”.

GC 12.3 WARRANTY

- .1 Revise paragraph 12.3.1 by replacing the words “one year” with “two years”.

- .2 Amend paragraph 12.3.1 by adding the following sentence at the end of that paragraph:

“Where the *Contractor* has been permitted to make use of permanent equipment or systems, as provided in GC3.11, prior to the issuance of the certificate of Substantial Performance of the *Work*, such permanent equipment or system shall be subject to the same warranty as described in this

GC12.3 and shall be judged, for purposes of assessing compliance with the warranty, as though the equipment or system was new, clean and unused by the *Contractor*, except for normal commissioning and startup activities, prior to the date of Ready for Takeover of the *Work*."

- .3 Delete the present text of 12.3.2 and substitute the following:

"The *Contractor* expressly warrants and guarantees to the *Owner* that the *Work* performed by the *Contractor* and by all *Workers*, *Suppliers* and *Subcontractors* conforms to the requirements of the *Contract Documents* and is performed in a safe and careful manner."

- .4 Revise paragraph 12.3.3 by replacing the words "one year" with "two years".

- .5 To paragraph 12.3.4 add new sentence:

"Except for extended warranties provided under this contract, the warranty period shall recommence for corrected *Work*".

- .6 Delete the present text of paragraph 12.3.5 and substitute the following:

"12.3.5 The *Contractor* shall correct and pay for all damages to the *Work* and/or property, goods or equipment of the *Owner* and/or his tenants and neighbouring properties, resulting from the defects, deficiencies or corrections of the same."

- .7 Add a new paragraphs 12.3.7 and 13.7.8 as follows:

"12.3.7 The *Contractor* shall commence to correct any deficiency within five (5) *Working Days* after consultant or *Owner*, issuance a notice from the *Consultant* or *Owner* and complete the *Work* as expeditiously as possible, except that in the case of urgent repairs, where the deficiency would prevent maintaining security or operating, as designed, of basic systems essential to the ongoing business of the *Owner*, all necessary corrections and/or installations or temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within two (2) hours of a notification, the *Owner* is authorized, irrespective of the conditions of GC 7.1, to carry out all necessary repairs or replacements at the *Contractor's* expense.

12.3.8 The *Contractor* shall assign to the *Owner* all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any *Subcontractor*, *Supplier* or other person in connection with the *Work* and such assignment shall be with the consent of the assigning party where required by law or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the *Owner* under the *Contract Documents*. Until the expiry of the relevant warranty periods enforceable against the *Contractor*, the *Owner* shall have in its custody all warranties, guarantees and other obligations to third parties respecting the *Work*."

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

- .1 Add new paragraph 13.1.0 as follows:

"13.1.0 The *Contractor* shall indemnify and hold harmless the *Consultant*, its agents and employees from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings 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 negligent acts or omissions the *Contractor* is liable, and

- .3 made by Notice in Writing within a period of 6 years from the Ready-for Takeover date or within such shorter such period as may be prescribed by any limitation statute or the Province or Territory of the Place of Work.
- .2 Add the words "13.1.0," after the word "paragraphs" in paragraph 13.1.3.

END OF SUPPLEMENTARY CONDITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 General Description of the Work
- .2 Work by others
- .3 Timing and sequencing of the Work
- .4 Owner occupancy

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises of the revitalization of Pebble Beach for the Town of Marathon, site located in **Marathon**, Ontario.
- .2 The location of the Work is 38 Howe Street, Marathon Ontario, herein known as the "Site".
- .3 The Owner is as follows:

Town of Marathon

1.3 DIVISION OF WORK

- .1 Division of the Work among Subcontractors and Suppliers is solely Contractor's responsibility. Consultant and Owner assume no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of the Work.

1.4 SPECIFICATIONS LANGUAGE AND STYLE

- .1 These specifications are written in the imperative mood and in streamlined form. The imperative language is directed to Contractor, unless stated otherwise.
- .2 Complete sentences by reading "shall", " Contractor shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.
- .3 Fulfill and perform all indicated requirements whether stated imperatively or otherwise.
- .4 When used in the context of a Product, read the word "provide" to mean "supply and install to result in a complete installation ready for its intended use".

1.5 DOCUMENTS AT THE SITE

- .1 Keep the following documents at Place of the Work, stored securely and in good order and available to Owner and Consultant in hard copy and electronic form:
 - .1 Current Contract Documents, including Drawings, Specifications and addenda.
 - .2 Change Orders, Change Directives, and Supplementary Instructions.
 - .3 Reviewed Shop Drawings, Product data and samples.
 - .5 Construction progress schedule.
 - .4 Field test reports and records.
 - .6 Meeting minutes.
 - .7 Manufacturer's certifications.
 - .8 Permits, inspection certificates, and other documents required by authorities having jurisdiction.
 - .9 Current as-built drawings.
 - .10 Material Safety Data Sheets (MSDS) for all controlled Products.

1.6 CONTRACTOR USE OF PREMISES

- .1 Except as otherwise specified, Contractor has unrestricted use of Place of the Work from time of Contract award until Ready-for-Takeover
- .2 Supply and install temporary signage required to demarcate temporary paths of travel as later directed by Consultant and to the satisfaction of the local building and fire departments.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Assume full responsibility for the protection and safekeeping of products under this Contract and within the limits of fencing/hoarding as defined by the drawings.
- .5 Confine Construction Equipment, Temporary Work, storage of Products, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and Contract Documents, whichever is most restrictive. Do not unreasonably encumber Place of the Work.

1.7 TIMING OF WORK

- .1 Time is of the essence in this contract.
- .2 Start construction immediately following the acceptance of the tender by the Owner.
- .3 Perform work continuously toward completion. Periods of inactivity on site will not be permitted without prior consent of the Owner.

1.8 WORK SEQUENCE

- .1 Coordinate the sequence of the Work with the Owner's representative to minimize disruption and inconvenience.
- .2 Refer to the Instructions For Bidders, section 00 21 00, for any specific sequence of construction work and associated timeframes to complete the work.

1.9 REGULATORY REQUIREMENTS

- .1 Ontario Building Code: Comply with Ontario Building Code 2012 including all amendments. Maintain one copy at the site.
- .2 Construction Safety: Comply with occupational Health and Safety Act and Ontario Fire Code Ontario Regulation 388/97 and amendments.
- .3 Referenced Standards: Comply with specifications standards produced by various organizations, included in the sections. Use latest edition.
- .4 Comply with local bylaws and regulations.
- .5 Smoking is prohibited on the property.

1.10 EXAMINATION

- .1 Examine the site of the project. Investigate the complete extent of work which is indicated in the contract documents. No allowance will be made for any error or negligence to fully understand the work and conditions. The contractor is to verify that all grades on the site are in conformance with the construction documents prior commencement of the work. The contractor is to notify the Consultant immediately should discrepancies be encountered.

- .2 Examine work of other sections before commencing work of any section. Commencement of new work shall imply acceptance of work by other sections upon which the new work depends.
- .3 Verify dimensions of work prepared by other sections before fabrication of new work.

1.11 PROJECT COORDINATION

- .1 Coordinate progress of the work, progress schedules, submittals, use of site, temporary utilities, construction facilities and controls.
- .2 Provide information required for preparation of coordination drawings. Prepare interference drawings to properly coordinate the work.
- .3 Check and verify all dimensions referring to the work.

1.12 PERMITS

- .1 Refer to CCDC2 2020 GC10.2.2.
- .2 All other permit costs will be the responsibility of the General Contractor including inspections, certification etc. associated with either partial occupancy of the project, as per the summary of work, or full occupancy of the project.

1.13 SERVICE CONNECTIONS

- .1 All costs associated with the connections to Municipal Services, hydro services, cable and phone services are the responsibility of the General Contractor unless stated otherwise in the Cash Allowance Section 01 21 00.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Cash allowances

1.2 REFERENCES

- .1 CCDC 2 2020, Stipulated Price Contract.
- .2 Project Supplementary Conditions

1.3 CASH ALLOWANCES

- .1 Refer to CCDC 2, Part 4 Allowances.
- .2 Include in Contract Price, cash allowances stated herein.
- .3 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing Work.
- .4 The Contract Price **includes** the allowance amount listed below including the Contractors overhead and profit. Expenditures from the cash allowance through the Contractor will be at cost with no mark-up. Individual subtrade pricing for each allowance item as required will be permitted an allowance for overhead and profit as outlined by the contract.
- .5 **Where the actual cost of the Work under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the Consultant's direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the Contract Price for overhead and profit.**
- .6 The cash allowance amount will be decreased on a continuous basis by way of a CAD – Cash Allowance Directive, issued by the consultant to confirm cash allowance monies are to be spent by the contractor.
- .7 Progress payments on accounts of work authorized under cash allowances shall be included in Consultant's monthly certificate for payment.
- .8 The allowance money as included within the contract can be expended by the consultant as required on any item. Upon total depletion of the allowance amount, any further expenditure will be completed by way of change order, as per CCDC 6.1, 6.2 and 6.3 as required.
- .9 Should the entire contingency amount not be spent during the contract, a credit change order shall be issued by the consultant.
- .10 The contractor shall provide services to call for competitive bids for portions of the work to be paid for by cash allowances, if requested by the Consultant.

1.4 ALLOWANCE AMOUNTS

- .1 Included in the Contract Price a cash allowance of \$ **TBD** which includes but not limited to the following items.
 - .1 Contingency (estimate \$50,000.00)
 - .2 Testing & Inspection (estimate \$_____)
- .2 Door Hardware-add to additional Price #1 \$_____)
- .3 Expenditures under allowance will be authorized in accordance with procedures provided in CCDC 2, GC 6.1 Changes, 6.2 Change Order, and Change Directive, and item 1.3.5. above by way of CAD as required and directed by the consultant.

END OF SECTION

PART 1 GENERAL

1.1 SCHEDULE OF LABOUR RATES

- .1 Prior to the first application for payment, submit for the Consultant's review a schedule of labour rates for all trades and classifications of trades, such as journeymen, apprentices, and foremen that will be employed in the Work. Provide a breakdown of payroll burden component of labour rates.
- .2 Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of the Contractor, Subcontractors, and sub-Subcontractors, stated as hourly rates, that will be used when:
 - .1 preparing price quotations for Change Orders, and
 - .2 determining the cost of work attributable to Change Directives.
 - .3 Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the Work, during regular working hours. Labour rates shall not include any additional overhead and profit component.
 - .4 Where collective agreements apply, the labour rates shall not exceed those established by collective agreement.
 - .5 Obtain the Owner's written acceptance of the schedule of labour rates before submitting the first Change Order quotation.
 - .6 Accepted schedule of labour rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.
 - .7 The Contractor may request amendments to the accepted schedule of labour rates if changes in the labour rates that will actually be paid, or payroll burden cost that will actually be incurred, in the normal performance of the Work can be demonstrated. Obtain the Owner's written acceptance of such changes.

1.2 SCHEDULE OF EQUIPMENT RATES

- .1 Prior to the first application for payment, submit for the Consultant's review a schedule of equipment rates for Contractor owned Construction Equipment.
- .2 Equipment rates shall reflect the rates that will be used when:
 - .1 preparing price quotations for Change Orders, and
 - .2 determining the cost of work attributable to Change Directives.
- .3 Equipment rates stated in the schedule shall be consistent with local equipment rental market rates and shall not include any additional overhead and profit component.
- .4 Obtain the Owner's written acceptance of the schedule of equipment rates before submitting the first Change Order quotation.
- .5 Accepted schedule of equipment rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.
- .6 The Contractor may request amendments to the accepted schedule of equipment

rates if changes in local equipment rental market rates can be demonstrated. Obtain the Owner's written acceptance of such changes.

1.3 CHANGE ORDER PROCEDURES

- .1 Upon issuance by the Consultant to the Contractor of a proposed change in the Work, and unless otherwise requested in the proposed change or unless otherwise agreed:
 - .1 Submit to the Consultant a fixed price quotation for the proposed change in the Work within 10 days after receipt of the proposed change in the Work.
 - .2 If requested in the proposed change, provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:
 - .1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.
 - .2 Estimated Product costs, including Supplier quotations, estimated quantities and unit prices.
 - .3 Estimated Construction Equipment costs.
 - .4 Enumeration of all other estimated costs included in the price quotation.
 - .5 Estimated credit amounts for labour and Products not required on account of the proposed change.
 - .6 Where applicable, Subcontractor quotations, also including a detailed breakdown of all of the above. All Mechanical and electrical subtrades MUST provide detail breakdowns.
 - .3 Include in the quotation the increase or decrease to the Contract Time, if any, for the proposed change, stated in number of days.
 - .4 Include in the quotation the number of days for which the quotation is valid.
 - .5 The quotation will be evaluated by the Consultant and the Owner and, if accepted by the Owner, be documented in the form of a signed Change Order.

1.1 MODIFICATIONS TO CONTRACT

- .1 Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work shall be based on a quotation for a fixed price increase or decrease to the Contract Price regardless of the Contractor's actual expenditures and savings.
 - .1 Supplemental Instruction: as issued by the Consultant, consistent with the intent of the Contract Documents, and will not involve an adjustment in Contract Price or Contract Time.
 - .2 Proposed Change: as issued by the Consultant, will notify the Contractor of an impending or proposed change to the Work, and will require submission of a quotation from the Contractor and all affected Subcontractors for each item noted. Submit quotation within the time period stipulated on the form, and indicate separate line items for labour and materials in each case. Work outlined in a Proposed Change must not proceed without the issuance of a Change Order signed by the Owner.
 - .3 Change Directive: will be issued by the Consultant where an immediate response is required to an on-site condition. This form will authorize the Contractor to proceed with the change, with the stipulation that accurate

accounts of costs be recorded, and may contain an upset cost, as agreed upon by the Owner and the Contractor.

- .4 Change Order: will be issued by the Consultant upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the Contractor to proceed with the change(s) proposed. A Change Order will amend the Contract Price, and/or the Contract Time.
- .5 Cash Allowance Directive (CAD): will be issued as necessary and defined by Section 01 21 13 upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the contractor to proceed with the change(s) proposed.

1.2 UNIT PRICES

- .1 Apply Unit Prices quoted in the Bid Form to extras to the Contract. Apply Unit Prices for credits from the Contract at a rate not less than 85% of the quoted Unit Price.
- .2 Work covered by Unit Prices will be executed in accordance with the Contract Documents. Unit Prices include all costs related to materials, labour, equipment, delivery and handling, statutory charges, overhead and profit, other related charges, and inclusive of all applicable duties and taxes (excluded HST), measured in place prior to excavation, or compacted/complete in place.

1.3 FEES FOR CHANGES IN THE WORK

- .1 The following fees will apply to the Contract Price for changes to the Work not covered by Unit Prices listed in Bid Form, and shall include all statutory charges, applicable duties and taxes, charges required by labour agreements in force, charges related to site and/or office overhead, project management and administration, all shop and field supervision, clerical, drafting, bonding costs, permits, associated payroll costs, and other charges incidental to the work including but not limited to handling, equipment warranty, identification, coordination, scheduling, Bill 208 and . Refer to GC 6.2.
- .2 Where the Contractor's price quotation for a Change Order or Change Directive results in a net increase to the Contract Price, the Contractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
 - .1 For work to be performed by the Contractor's own forces: As per Supplementary General Conditions Section 00 54 00, GC6.2
 - .2 For work to be performed by a Subcontractor: As per Supplementary General Conditions Section 00 54 00, GC6.2
- .3 Where a Subcontractor's price quotation for a Change Order or Change Directive results in a net increase to the Subcontractor's contract price, the Subcontractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
 - .1 For work to be performed by the Subcontractor's own forces: As per Supplementary General Conditions Section 00 54 00, GC6.2
 - .2 For work to be performed by a sub-Subcontractor: As per Supplementary General Conditions Section 00 54 00, GC6.2
- .4 Where the Contractor's or a Subcontractor's price quotation for a Change Order

results in a net decrease in price before adjustment for fees for overhead and profit, such a price quotation shall be for the net decrease without any adjustment for fees for overhead and profit.

- .5 The Fees for Changes In the Work shall apply only to extras to the Contract. Contractor or Subcontractor mark-up will not be applied to credits.

END OF SECTION

Part 1 General

1.1 APPLICATIONS FOR PAYMENT

- .1 Refer to CCDC2 2020 and Section 00 54 00 Supplementary General Conditions for proper invoice requirements of the contract.

1.2 SCHEDULE OF VALUES

- .1 Prior to the first application for payment, submit for Consultant's review an initial schedule of values. Modify the initial schedule of values if and as requested by Consultant. Obtain Consultant's written acceptance of the initial schedule of values prior to the first application for payment.
- .2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and Products delivered to Place of the Work.
- .3 Provide the schedule of values in an electronic spreadsheet format that provides for inclusion of the following information:
 - .1 Identifying information including title and location of the Work, name of Contractor, number and date of application for payment, and period covered by the application for payment.
- .4 A work breakdown structure that is sufficiently detailed and comprehensive to facilitate Consultant's evaluation of applications for payment at an appropriate level of detail.
- .5 Provisions for approved Change Orders [allowances,] [unit price work] [and] [assignable contracts] so that the breakdown amounts indicated in the schedule of values aggregate to the current total Contract Price. Also provide for indicating the estimated value of Change Directives within the schedule of values, separately from the current total Contract Price.
- .6 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:
 - .1 Breakdown Amount: A dollar amount, including an appropriate pro rata portion of Contactor's overhead and profit.
 - .1 General Accounts
 - .2 Mobilization
 - .3 Supervision
 - .4 Bonds and Insurance
 - .5 Permits and Licenses
 - .6 Operations and Maintenance Manuals/As-Built Drawings
 - .7 All trades or portions of the Work, generally in chronological order
 - .8 Provision of other Products and/or services
 - .9 Cash Allowance expenditures
 - .10 Changes in the Work
 - .2 Performed to Date: The value of Work performed and Products delivered to Place of the Work up to the date of the application for payment, stated as a percentage of the Contract Price and in dollars.
 - .3 Previously Performed: The value of Work performed and Products delivered to the Place of the Work for which payment has been previously certified, stated in dollars.

- .4 Current Period: The value of Work performed and Products delivered to Place of the Work for which Contractor is currently applying for payment, stated in dollars.
- .5 Balance to Complete: The value of Work not yet performed and Products not yet delivered to Place of the Work, stated in dollars.
- .7 The total Contract amount for each trade or portion of the Work shall be listed beside each item.
- .8 Commissioning:
 - .1 The commissioning process shall be allocated a value equal to 3% of the Contract. The value shall be itemized in the Schedule of Values which forms the basis for progress payments for the various portions of Work. The Contractor may draw from the allocation as the commissioning process is completed.
 - .2 The Contractor shall submit all test and verification forms. The Consultant will use these forms to calculate a percentage complete.
 - .3 The Contractor may claim up to 5% of the Contract, as per Schedule of Values, on a monthly basis, from this allocation leading up to performance testing. The remaining 3% shall not be paid out until the performance testing, O & M manuals and Owner's training have been completed satisfactorily.
 - .4 Commissioning activities are non-compensable and cannot be a cause for delay claims.
- .9 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.

1.3 PROPER INVOICE

- .1 Refer to CCDC 2, GC 5.2 and Section 00 54 00 Amendment to CCDC 2-2008.

1.4 STATUTORY DECLARATIONS

- .1 Submit a statutory declaration in the form of CCDC 9A – Statutory Declaration of Progress Payment Distribution by Contractor with each application for payment except the first.

1.5 WORKERS' COMPENSATION CLEARANCE

- .1 Submit proof of workers' compensation clearance with each application for payment.

1.6 PAYMENT FOR PRODUCTS STORED OFF SITE

- .1 Owner may, due to extraordinary circumstances and at Owner's sole discretion, make payments for Products delivered to and stored at a location other than Place of the Work, subject to:
 - .1 a request submitted by Contractor in writing, with appropriate justification, and
 - .2 whatever conditions Owner or Consultant may establish for such payments, as required to protect Owner's interests.

1.7 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to CCDC 2, GC 5.4 and Section 00 54 00 Amendment to CCDC 2-2020.
- .2 After receipt of list and application, Consultant will review Work to verify validity of application. After completing review, Consultant will notify Contractor if Work or designated portion of Work is substantially performed.
- .3 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.
- .4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.8 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to CCDC 2, GC 5.4 and Section 00 54 00 Amendment to CCDC 2-2020.

1.9 FINAL PAYMENT

- .1 Refer to CCDC 2, GC 5.5 and Section 00 54 00 Amendment to CCDC 2-2020

END OF SECTION

PART 1 GENERAL

1.1 PROJECT MANAGEMENT & COORDINATION

.1 Project Coordination

- .1 The Contractor is responsible for the overall coordination of the Work. Coordinate the work of all subcontractors, and provide such assistance as is necessary, including but not limited to;
 - .1 Providing site dimensions and layout,
 - .2 Providing temporary facilities and controls,
 - .3 Scheduling subcontractors work to prevent conflicts,
 - .4 Scheduling and administering regular subtrade scheduling and coordination meetings throughout progress of the Work.
 - .5 Scheduling and administering regular subtrade safety meetings throughout progress of the Work.
- .2 The Contractor shall facilitate production of interference drawings where necessary for coordination of the Work. Provide such interference drawings to the Consultant for review.
- .3 The Contractor shall be the "Constructor" as defined under the Occupational Health and Safety Act, and shall be solely responsible for all construction safety on site.

.2 Project Supervision

- .1 The Contractor shall provide and maintain full-time supervision on site. The supervisor shall be responsible for the overall day-to-day coordination on site between subtrades.
- .2 The supervisor shall coordinate the work of all subcontractors, and provide such assistance as is necessary, including but not limited to;
 - .1 Layout,
 - .2 Rough carpentry work for blocking, strapping, nailers, etc.

.3 Project Meetings

- .1 A start-up preconstruction meeting will be conducted on site prior to commencement of the work between Consultant, Owner, Contractor and any such subcontractor wishing to attend.
- .2 All other such meetings will be arranged as required dependent on the work.
- .3 Provide physical space and make arrangements for meetings.
- .4 Consultant will record minutes. Itemize significant proceedings and decisions. Identify 'action by' appropriate parties.
- .5 Reproduce and distribute copies of minutes within three working days after each meeting and transmit to meeting participants and affected parties not in attendance.

.4 Project Site Administration

- .1 Maintain at job site, one copy each of the following:

- .1 Permit Drawings
 - .2 Contract Documents.
 - .3 Addenda and Bid Revisions.
 - .4 Reviewed shop drawings.
 - .5 Change orders and other Contract modifications.
 - .6 Field test and inspection reports.
 - .7 Approved schedules.
 - .8 Manufacturer's installation and application instructions.
- .5 Owner Documentation
- .1 The Contractor shall assist the Owner with providing documentation required to obtain HST rebates on certain components of the project.

1.2 SCHEDULES

- .1 Construction Progress Schedule.
 - .1 Prepare schedule in horizontal chart form, with weekly horizontal time scale identifying first/last work day of each week. Schedule must utilize "critical path" method.
 - .2 Indicate separate line for each trade or operation of the Work. Arrange trades in chronological order for commencement of that part of the Work.
 - .3 Identify projected major milestones in the course of the Work such as completion of foundation work, structure, closing in, major inspections by building officials, Substantial Performance, etc.
- .2 Submittal Schedule
 - .1 Provide schedule for submittal of all Shop Drawings, Product Data and Samples, prior to Start-up Meeting as per 1.1.3.
 - .2 Provide complete list of all manufactured products to be used in the course of the Work, including those amended by addenda.
- .5 Submission of Schedules
 - .1 Submit one copy of each schedule to the Consultant for review, prior to first progress billing. Amend schedules as required. Submit amended schedules with each subsequent Progress Billing.
 - .2 Submit 4 copies of each subsequent issue of schedules to the Consultant.
 - .3 Update schedule on a regular basis or as requested by the Consultant.

1.3 ADDITIONAL DOCUMENTS

- .1 Consultant may issue additional documents in the form of drawings, specifications, schedules, or written instructions to assist proper execution of the Work. These documents shall take one of the following forms as defined in the Contract:
 - .1 Supplemental Instruction: no adjustment in Contract Price or Contract Time.
 - .2 Change Order: amendment to the Contract recommended by the Consultant, and agreed upon by the Owner and the Contractor.

1.4 SUBMITTAL PROCEDURES

- .1 Submit to Consultant, all items specified for review, with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample

time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

- .2 Schedule submissions at least 10 working days before reviewed submissions will be needed.
- .3 Do not proceed with work affected by the submittal until review is complete.
- .4 Review all submittals prior to submission to the Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the Work and the Contract Documents. Submittals not stamped, signed, and dated will be returned without review.
- .5 Verify field measurements and affected adjacent work are coordinated.
- .6 Contractor's responsibility for errors and omissions in submission, or deviations from requirements of Contract Documents, is not relieved by Consultant's review of submittals.
- .7 Keep one reviewed copy of each submission on site.
- .8 Shop Drawings
 - .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
 - .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the Section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .3 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the Work.
 - .4 Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those requested.
 - .5 Submit 4 copies of all shop drawings.
 - .6 Shop drawings submitted by FAX, or as copies of FAX transmissions are not acceptable as shop drawings, and will not be reviewed.
 - .7 Reproductions of Consultants' drawings are acceptable for the purpose of creating Shop Drawings, provided they indicate all necessary fabrication, erection, construction, and installation details, in addition to the detail shown on the Consultants' drawings.
 - .8 Electronic files of Architectural Drawings may be obtained for the purpose of creating Shop Drawings, subject to the terms and conditions of the Electronic Files Transfer Agreement. The Contractor may purchase the drawings from the Architect at a cost to be negotiated between Architect and General Contractor for distribution of drawings to the subtrades at their own discretion and coordination.

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- .9 Shop drawings not submitted in the scale type of the contract documents (ie. metric for metric drawings) will not be reviewed.
 - .9 Product Data Sheets
 - .1 Manufacturer's standard schematics, catalogue sheets, diagrams, schedules, performance charts, illustrations and other descriptive data are acceptable in lieu of shop drawings, where specified.
 - .2 Product Data Sheets are acceptable provided they conform to the following:
 - .1 Information not applicable to project has been deleted.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Show wiring diagrams, when requested, and controls.
 - .3 Submit product data sheets or brochures for requirements requested in specification Sections and as the Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
 - .4 Submit copies of all WHMIS Data Sheets.
 - .5 Submit 4 copies of Product Data Sheets.
 - .6 Product data sheets submitted by FAX, or as copies of FAX transmissions will not be accepted.
 - .10 Return of Submissions
 - .1 If upon review by the Consultant, no errors or omissions are discovered or if only minor corrections are made, the shop drawing transparency or one copy of the product data will be returned and fabrication and installation of Work may proceed.
 - .2 If shop drawings or data sheets are rejected, noted copy will be returned and resubmission of corrected shop drawings or data sheets through the same procedure indicated above, shall be performed before fabrication and installation of Work may proceed.
 - .11 Samples
 - .1 Submit samples for review, in duplicate, in sizes requested in respective specification sections. Label samples as to origin and intended use in the Work.
 - .2 Where colour, pattern or texture is criteria, submit full range of samples.
 - .3 Deliver samples prepaid to Consultant's office.
 - .4 Notify the Consultant in writing, at the time of submission of deviations in samples from requirements of Contract Documents.
 - .5 Adjustments made on samples by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the work.

-
- .6 Make changes in samples which the Consultant may require, consistent with Contract Documents.
 - .7 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.
 - .12 Submission Requirements
 - .1 Accompany submissions with transmittal letter containing:
 - .1 Date,
 - .2 Project title and number,
 - .3 Contractor's name and address,
 - .4 Drawing/page numbers of each shop drawing or data sheet,
 - .5 Identification (ie. "Structural Steel Shop Dwgs."), and
 - .6 Number of copies submitted.
 - .2 Submissions shall include (where applicable) :
 - .1 Date and revision date,
 - .2 Project title and number,
 - .3 Name of Contractor, Subcontractor(s), Supplier/Manufacturer,
 - .4 Identification of product or material,
 - .5 Relation to adjacent structure or materials,
 - .6 Field dimensions, clearly identified as such,
 - .7 Reference standards (CSA, CGSB, ASTM, etc.), and
 - .8 Contractor's stamp, initialed or signed, certifying review of submission, and verification of field measurements.
 - .13 Distribution of Submittals after Review
 - .1 Distribute copies of shop drawings and product data which carry Consultant's stamp as follows (where applicable):
 - .1 Job site file (Record documents),
 - .2 General Contractor's office,
 - .3 Subcontractors, and .
 - .4 Suppliers or Fabricators.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Coordination Work with other contractors under administration of Architect.
- .2 Scheduled progress meetings.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 Summary of Work.

1.3 DESCRIPTION

- .1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities and construction Work, with progress of Work of other contractors, under instructions of Consultant.

1.4 PROJECT MEETINGS

- .1 Attend scheduled weekly project meetings throughout progress of Work as determined by Consultant.
- .2 Agenda to include, but not limited to, the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.
- .3 Distribute minutes and notices of meeting to all related sub trades.
- .4 The Contractor shall provide physical space for meetings.

1.5 CONSTRUCTION ORGANIZATION AND START UP

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of the Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.

- .2 Schedule of Work, progress scheduling in accordance with Section 01 32 00 Construction Progress Documentation.
 - .3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01 33 00 Submittal Procedures.
 - .4 Delivery schedule of specified equipment in accordance with Section 01 32 00 Construction Progress Documentation.
 - .6 Site security in accordance with Section 01 52 00 Construction Facilities.
 - .7 Proposed changes, change orders, procedures, approvals required, mark up percentages permitted, time extensions, overtime, and administrative requirements (GC).
 - .8 Record drawings in accordance with Section 01 78 00 Closeout Submittals.
 - .9 Maintenance in accordance with Section 01 78 00 Closeout Submittals.
 - .10 Take over procedures, acceptance, and warranties in accordance with Section 01 77 00 Closeout Procedures and 01 78 00 Closeout Submittals.
 - .11 Monthly progress claims, administrative procedures, photographs, and holdbacks (GC).
 - .12 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 Quality Control.
 - .13 Insurances and transcript of policies (GC).
-
- .6 Comply with Consultant's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
 - .7 During construction coordinate use of site and facilities through Consultant's procedures for intra project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
 - .8 Comply with instructions of Consultant for use of temporary utilities and construction facilities.
 - .9 Coordinate field engineering and layout work with Consultant.

1.6 SCHEDULES

- .1 Construction Progress Schedule. Refer to Section 01 32 16 Construction Schedule
- .2 Submittal Schedule
 - .1 Provide schedule for submittal of all Shop Drawings, Product Data and Samples, prior to Start-up Meeting as per 1.1.3.
 - .2 Provide complete list of all manufactured products to be used in the course of the Work, including those amended by addenda.
- .3 Submission of Schedules
 - .1 Submit one copy of each schedule to the Consultant for review, prior to first progress billing. Amend schedules as required. Submit amended schedules with each subsequent Progress Billing.
 - .2 Submit copies of each subsequent issue of schedules to the Consultant and Owner.
 - .3 Update schedule on a regular basis or as requested by the Consultant.

1.7 SUBMITTALS

- .1 Make submittal to Consultant for review.
- .2 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 for review for compliance with Contract Documents; for field dimensions and clearances, for relation to

available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Consultant.

1.8 PROGRESS PHOTOGRAPHS

- .1 Arrange for weekly digital photography to document and provide a photographic record of the progress of the Work.
- .2 Identify each photograph by project name and date taken.
- .3 Submission: Submit .jpg format files in standard resolution via project web site weekly and at at completion of excavation, foundation, framing and services before concealment.
- .4 Do not use progress or any other Project photographs for promotional purposes without Owner's written consent.

1.9 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

- .1 Obtain from Consultant an electronic copy of the construction Drawings for the purpose of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction Drawings.
- .2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Record actual construction including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Orders, Change Directives and Supplemental Instructions
 - .6 References to Shop Drawings, where Shop Drawings show more detail.
- .4 Do not use as-built drawings for construction purposes.

1.10 CLOSEOUT PROCEDURES

- .1 Refer to CCDC2 2020 and Section 01 78 000 – Close-out Submittals

END OF SECTION

1.1 SECTION INCLUDES

- .1 Schedule, form, content.
- .2 Scheduled revisions.

1.2 RELATED SECTIONS

- .1 Section 01 77 00 Closeout Procedures.

1.3 SCHEDULES REQUIRED

- .1 Submit schedules as follows:
 - .1 Construction Progress Schedule.
 - .2 Submittal Schedule for Shop Drawings and Product Data.
 - .3 Submittal Schedule for Samples.
 - .4 Submittal Schedule for timeliness of Owner furnished Products.
 - .5 Product Delivery Schedule.
 - .6 Cash Allowance Schedule for purchasing Products.
 - .7 Shutdown or closure activity.

1.4 FORMAT

- .1 Prepare schedule in form of a horizontal Gant bar chart.
- .2 Provide a separate bar for each major item of work trade or operation.
- .3 Split horizontally for projected and actual performance.
- .4 Provide horizontal time scale identifying first work day of each week.
- .5 Format for listings: chronological order of start of each item of work.
- .6 Identification of listings: By Systems description.

1.5 SUBMISSION

- .1 Submit initial format of schedules within 15 working days after award of Contract.
- .2 Submit schedules in electronic format, forward on disc, through e mail as pdf files.
- .3 Submit one reproduction, plus 2 copies to be retained by Consultant.
- .4 Consultant will review schedule and return review copy within 10 days after receipt.
- .5 Resubmit finalized schedule within 7 days after return of review copy.
- .6 Submit revised progress schedule with each application for payment.
- .7 Distribute copies of revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
- .8 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.

1.6 SUBMITTALS SCHEDULE

- .1 Include schedule for submitting shop drawings, product data and samples.
- .2 Indicate dates for submitting, review time, re-submission time, last date for meeting fabrication schedule.

1.7 PROGRESS DRAW SCHEDULE

- .1 Provide progress draw schedule itemized as per, this Section Item No. 1.4 and CCDC2 Contract. Consultant to approve format before proceeding. Submit draft 15 days before first draw.

END OF SECTION

1.1 SECTION INCLUDES

- .1 Schedule, form, content.
- .2 Schedule revisions.

1.2 RELATED SECTIONS

- .1 Section 00 54 00 – Amendment Supplementary General Conditions
- .2 Section 01 30 00 – Administrative Requirements

1.3 SCHEDULE REQUIREMENTS

- .1 The Consultant will establish and maintain a project schedule which will identify the duration and completion dates for each major construction activity.
- .2 Within 15 days of award of the Contract, the Contractor shall prepare and submit a construction schedule for its work within the framework of the project schedule. For each scheduled activity ("Task") within the Contractor's construction schedule, the Contractor shall identify at least the following:
 - Task name
 - Task duration
 - Task start date
 - Task end date
 - Task Value
 - Interdependency with other Tasks (finish-to-start, start-to-finish, start-to-start, finish-to-finish)
 - Resource allocation (if requested by the Consultant)
- .3 For each Task in the Contractor's construction schedule the Contractor shall assign a value ("Task Value") corresponding to the total of the labour, material, equipment, overhead and profit associated with that task within the Contractor's fixed price contract amount. The sum of the Task Values for all of the tasks in the Contractor's construction schedule shall equal the total contract amount.
- .4 The Consultant will review the Contractor's construction schedule and, once approved, it will become part of the project schedule.
- .5 The Contractor shall make whatever revisions to its construction schedule the Consultant may reasonably require and provide supporting information as may be requested to verify compliance with the project schedule.
- .6 The Contractor's construction schedule will include, but shall not be limited to, the following Tasks:
 - a. Shop Drawing schedule – including allowance for preparation, review and resubmission
 - b. Submittal schedule. Refer to Section 01 31 00 – Project management and Coordination.
 - c. Fabrication and delivery schedule

- d. Temporary works
 - e. Construction activities
 - f. Commissioning, testing, start-up and demonstrations
 - g. Change Orders
 - h. Resource allocation (if requested by the Consultant)
- .7 The schedule software used by the Contractor shall be Primavera or MSProject. The Contractor shall submit to the Consultant one hard copy of the Contractor's construction schedule and one electronic copy prepared using either Primavera or MSProject. Monthly updates of the Contractor's construction schedule shall similarly be submitted as on hard copy and one electronic copy prepared using Primavera or MSProject software.
- .8 The Contractor is required to update the construction schedule and report to the Consultant on a monthly basis. The monthly update of the Contractor's construction schedule shall identify the percentage completion for every Task, including approved changes to the Contract. The product of the percentage complete multiplied by the Task Value, and summed for all Tasks on the Contractor's construction schedule, shall equal the total progress claimed. The submission of the updated Contractor's construction schedule, including the identification of the percentage completion of all Tasks in accordance with the foregoing requirement, shall be a prerequisite to the certification by the Consultant of any progress claim.
- .9 If the Contractor and the Consultant agree to a change in the Contractor's construction schedule then the Contractor shall submit a revised construction schedule that identifies the Task Values for all Tasks within the revised construction schedule and the percentage completion for all Tasks.

1.4 MATERIAL AVAILABILITY

- .1 Immediately upon signing the Contract the Contractor and its Trade Subcontractors and Suppliers shall review Product delivery requirements and anticipate foreseeable supply delays for Products. If delays in supply of Products are foreseeable, the Contractor shall notify the Consultant of such, in order that substitutions or other remedial action may be authorized in time to prevent delay in performance of the Work.

1.5 COMPLIANCE WITH THE PROJECT SCHEDULE

- .1 The Contractor is required to comply with the project schedule and is required to coordinate and direct its Trade Subcontractors and Suppliers in accordance with these requirements.
- .2 The Contractor shall provide sufficient number of skilled personnel to maintain the progress of the Work.
- .3 If in the opinion of the Consultant, the Contractor is delaying the work of other Contractors then the Contractor will be responsible for costs to regain time lost, including but not necessarily limited to the premium costs for other Contractors to regain lost time.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Division 23 - Mechanical Identification.

1.3 ADMINISTRATIVE

- .1 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .3 Where items or information is not produced in SI Metric units converted values are acceptable.
- .4 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .5 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work are coordinated.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Consultants review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .9 Keep one reviewed copy of each submission on site.
- .10 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Allow 10 Working Days for Consultant's review of each submittal and incorporate in submittals schedule specified in Section 01 32 00 – Construction Progress Documentation. Allow additional 5 Working Days where sub-Consultant or commissioning agent review is required.
- .2 If upon Consultant's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.

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- .3 If upon Consultant's review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.
 - .4 Consultant's notations on submittals are intended to ensure compliance with Contract Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If Contractor considers any Consultant's notation to be a change in the Work, promptly notify Consultant in writing before proceeding with the Work.
 - .5 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
 - .6 The word "stamps" in phrase (leave room on drawings for stamps) means drawing review stamp. Allow space on shop drawings minimum 150mm x 150mm clear for stamp and notations.
 - .7 Review of shop drawings by the Consultant and all other Consultants is a precaution against oversight or error and solely to review conformance with general design intent. It is not a detailed check and must not be construed as relieving the Contractor of responsibility for making the Work accurate and in conformity with the Contract Documents. Design for which the Contractor is responsible under the Contract will not be reviewed. Work done prior to the receipt of the reviewed drawings will be at the risk of the Contractor. Review comments are not authorization for changes to the Contract price.
 - .8 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data, which are to be provided by Contractor to illustrate details of a portion of Work.
 - .9 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.
 - .10 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .11 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of: Subcontractor, Supplier, and Manufacturer.
 - .4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.

- .10 Relationship to adjacent work.
- .11 Relationship to interference drawings
- .12 After Consultants review, distribute copies.
- .13 Shop Drawing
 - .1 Architectural Shop Drawings submissions may be sent electronically via email in PDF format .
- .14 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product in electronic format acceptable to Consultant.
- .15 Submit MSDS sheets to Consultant for requirements in specification Sections and as requested by Consultant.
- .16 Delete information not applicable to project.
- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by Consultant, 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 re-submission of corrected shop drawings, through same procedure indicated above, and must be performed before fabrication and installation of Work may proceed.
- .19 Submit revised as built record hard and electronic copy of drawings and supporting data quarterly.
- .20 Shop Drawings: After review, all shop drawings will be returned to the Contractor stamped to show one of the following:

Reviewed	Reviewed with no comments.
Reviewed as Noted	Reviewed with comments noted on drawing. Correct and resubmit for review.
Revise & Resubmit	Resubmit for review.

The contractor must conform to each request as above and as indicated. Revisions, re-submissions and amendments as required will not constitute an increase to project schedule. Take all necessary actions to revise and resubmit to coordinate and meet the project schedule. Include all necessary coordination of any and all shop drawings, of all disciplines, with interference drawings, and ensure cross over of all trades are integrated as well as coordinated. Cross reference shop drawings with interference drawings, submittals and quality assurance manuals.

1.5 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant. Electronic submissions will not be accepted unless approved by the consultant in advance.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

- .6 Make changes in samples, which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified. Add accepted samples to Quality Control manuals as schedule.

2 **PRODUCTS** - Not Used
3 **EXECUTION** - Not Used

END OF SECTION

1.1 Requirements Included

- .1 Field engineering survey services to measure and stake the site.
- .2 Survey services to establish and confirm invert measurements for the Work.
- .3 Submit name and address of registered land surveyor performing survey work.
- .4 Submit to Consultant the survey of the Work prepared and issued by a registered land surveyor on completion of the building footings and foundations as required by authorities having jurisdiction and on completion of the Work.

1.2 Related Requirements

- .1 All Sections of Division 01
- .2 Owner's identification of existing survey control points and property limits.

1.3 Qualification of Surveyor

- .1 Qualified registered land surveyor, acceptable to Owner.

1.4 Survey Reference Points

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

1.5 Survey Requirements

- .1 Establish lines and levels, locate and lay out, by instrumentation.
- .2 Stake for grading, fill and topsoil placement and landscaping features.
- .3 Stake slopes.
- .4 Establish pipe invert elevations.
- .5 Stake batter boards for foundations.
- .6 Establish foundation column locations and floor elevations.
- .7 Establish lines and levels for mechanical and electrical work.

1.6 Records

- .1 Maintain a complete, accurate log of control and survey work as it progresses. Record locations with horizontal and vertical data in project record documents.
- .2 On completion of foundations and major site improvements, prepare a certified survey drawing showing dimensions, locations, angles and elevations of Work.
- .3 Prior to any site activity or disturbances of existing grades, a signed acceptance of the existing grades within the Extent of Contract and their corresponding elevations shall be provided to the Owner. The signed acceptance shall be on a form provided shortly following the award of contract."
- .4 The format of the existing grade acceptance form is attached to this section of the specifications."

1.7 EXISTING UTILITIES AND STRUCTURES

- .1 Before commencing excavation, drilling or other earthwork, establish or confirm location and extent of all existing underground utilities and structures in work area.
- .2 Promptly notify Consultant if underground utilities, structures, or their locations differ from those indicated in Contract Documents or in available project information. Consultant will provide appropriate direction.
- .3 Record locations of maintained, re-routed and abandoned utility lines.

1.8 VERIFICATION OF EXISTING CONDITIONS

- .1 Where work specified in any Section is dependent on the work of another Section or Sections having been properly completed, verify that work is complete and in a condition suitable to receive the subsequent work. Commencement of work of a Section that is dependent on the work of another Section or Sections having been properly completed, means acceptance of the existing conditions.
- .2 Verify that ambient conditions are suitable before commencing the work of any Section and will remain suitable for as long as required for proper setting, curing, or drying of Products used.
- .3 Ensure that substrate surfaces are clean, dimensionally stable, cured and free of contaminants.
- .4 Notify Consultant in writing of unacceptable conditions.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .2 Canadian Standards Association (CSA)
 - .1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures.
- .3 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990.

1.2 CONSTRUCTION SAFETY MEASURES

- .1 Comply with:
 - .1 National Building Code, Part 8 Safety Measures at Construction and Demolition Sites.
 - .2 Workers Safety and Insurance Board.
 - .3 Municipal Authorities

1.3 FILING OF NOTICE

- .1 File Notice with Provincial authorities prior to commencement of Work.

1.4 WORK PERMIT

- .1 Obtain Ministry of Labour Notification of Project Permit prior to commencement of work.

1.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

- .1 Pre-construction meetings: attend health and safety pre-construction meeting.

1.7 REGULATORY REQUIREMENTS

- .1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.8 WHMIS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, labeling and disposal of hazardous materials. Provide Material Safety Data Sheets.
- .2 Maintain copies of WHMIS data sheets on file at site; turn over to Owner on completion of project, under Section 01780.

1.9 FIRE SAFETY REQUIREMENTS

- .1 Comply with requirements of Fire Commission of Canada, Labour Canada.
- .2 Inform Municipal Fire Department of progress of work. Advise representatives of any potential hazardous operations or shut down of safety systems or devices.
- .3 Provide any details required by Fire Department.

1.10 OVERLOADING

- .1 Ensure that no part of the work is subjected to loading that will endanger safety or will cause permanent deformation.

1.11 FALSEWORK

- .1 Design and construct falsework to CSA S269.1.

1.12 SCAFFOLDING

- .1 Design and construct scaffolding to CSA S269.2.

1.13 RESPONSIBILITY

- 1. Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.
- 2. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 3. Comply with Ontario Health and Safety Act.

1.14 UNFORESEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Consultant verbally and in writing.

1.15 CORRECTION OF NON-COMPLIANCE

- 1. Immediately address health and safety non-compliance issues identified by Consultant.
- 2. Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 POWDER ACTUATED DEVICES

- 1. Use powder actuated devices only after receipt written permission from Consultant.

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Consultant may also stop Work for health and safety considerations.

END OF SECTION

PART 1 GENERAL

1.1 FIRES

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

1.2 DISPOSAL OF WASTES

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

1.3 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Engineer/Architect.

1.5 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or within 100 m of indicated spawning beds.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authority's emission requirements.

- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.

1.2 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EHW Regulations), SOR/92 637.
- .2 National Fire Code of Canada 2010.
- .3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T 19.01).
- .4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/85 77, SOR/85 585, SOR/85 609, SOR/86 526).

1.3 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 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.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to Consultant current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
- .3 Submit hazardous materials management plan to Consultant that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.5 STORAGE AND HANDLING

- .1 Coordinate storage of hazardous materials with Consultant and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use. Store all flammable and combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Consultant.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat producing devices.
- .7 Flammable liquids having a flash point below 38°C, such as naphtha or gasoline, will not be used as solvents or cleaning agents.

- .8 Store flammable and combustible waste liquids for disposal in approved containers located in a safe, ventilated area. Keep quantities to a minimum.
- .9 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .10 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .12 Report spills or accidents immediately to Consultant. Submit a written spill report to Consultant within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Generals Contractor.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide a photocopy of all shipping documents and waste manifests to Consultant.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Consultant.
 - .9 Report any discharge, emission, or escape of hazardous materials immediately to Consultant and appropriate provincial authority. Take reasonable measures to control release.

2 PRODUCTS

2.1 MATERIALS

- .1 Only bring on site the quantity of hazardous materials required to perform work.
- .2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

3 EXECUTION

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 78 00 Closeout Submittals.

1.3 INSPECTION

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

1.4 INDEPENDENT INSPECTION AGENCIES

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

1.5 ACCESS TO WORK

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

1.6 PROCEDURES

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

1.7 REJECTED WORK

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

1.8 REPORTS

- .1 Consultant will distribute copies of inspection and test reports.
- .2 Provide copies to Subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX DESIGNS

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

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- .1 Barriers
- .2 Environmental Controls
- .3 Construction Aids
- .4 Use of the work
- .5 Traffic controls
- .6 Utilities
- .7 Protection
- .8 Office and sheds
- .9 Project identification
- .10 Progressive cleaning

1.2 INSTALLATION/REMOVAL

- .1 Provide construction facilities and temporary controls in order to execute the work expeditiously and as may be required by health and safety legislation.
- .2 Remove from site all such work after use.

1.3 HOARDING

- .1 Provide hoarding, protecting public and private property from injury or damage. Provide lockable gates within hoarding for access to site by workers and vehicles.
- .2 Erect fencing around perimeter of site to protect the public, workers, public and private property from injury or damage as required.
- .3 Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to building.
- .4 Provide barriers around trees and plants designated to remain. Protect from damage.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard railings and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide a protection as required by governing authorities.

1.5 HOISTING

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists and cranes shall be operated by qualified operator.

1.6 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.7 SITE STORAGE/LOADING

- .1 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with products.

- .2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .3 During Phase One, deliveries to and waste removal from the building, required for the operation of the facility, must pass through the area designated for Contractor's use during this Phase. Facilitate safe passage of such vehicles and personnel through the zone of construction activity, and do not unreasonably restrict deliveries or pick-ups.

1.8 ACCESS TO SITE

- .1 Provide, maintain and repair existing parking lots, roads, sidewalk crossings.
- .2 Provide and maintain temporary ramps and construction runways as may be required for access to the Work, and for use by Owner and public.

1.9 STREETS AND TRAFFIC CONTROL

- .1 The Contractor shall provide all necessary flagmen, detour signs, warning lights, signs and barricades necessary to notify, direct and protect pedestrian and vehicular traffic en route to and from and within the project limits, and shall conduct his operations to ensure the safety and avoid inconvenience to the travelling public and nearby residents and facility users.
- .2 The Contractor shall maintain access streets to the site clean of dust, mud and debris. The Consultant may request that the Contractor sweep such access streets, if in the opinion of the Consultant the Contractor's operations have created the need. No payment to the Contractor for such demands will be made.

1.10 CONSTRUCTION PARKING

- .1 Parking will be permitted on site.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, make good damage resulting from Contractors' use of roads.
- .4 The existing paved parking lot is not to be used at anytime.

1.11 SANITARY FACILITIES

- .1 Provide sufficient sanitary facilities for workers in accordance with local health authorities. Use of the existing building facilities is prohibited.
- .2 Maintain in clean condition.

1.12 TEMPORARY POWER

- .1 Contractor will provide temporary power required during construction for temporary lighting and the operating of power tools.
- .2 Pay all costs for the installation, and distribution of temporary power and lighting.
- .3 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.

1.13 TEMPORARY TELEPHONE

- .1 Provide Site Superintendent with cellular telephone to be carried on his person during normal working hours complete with message recording service.

1.14 UTILITIES, FENCES AND PRIVATE PROPERTY

- .1 The Contractor shall be responsible for the protection of all utilities, fences and private property at the job site during the time of construction.
- .2 Utilities
 - .1 General
 - .1 The Contractor shall pay all costs deemed necessary by the Utility authorities to provide all protective measures within the limits of the Contract. The Contractor shall remain responsible for any unauthorized disruptions of service and any damage to utilities arising out of the Contractor's work, notwithstanding such protection. The Utility authorities will carry out all the work of temporary rearranging and shielding of lines deemed necessary. The cost of all such protective measures, together with the cost of restoring the lines to their original state and location, will be at the expense of the Contractor, and will be billed to the Contractor by the Utility authority.
 - .2 Whenever, in the opinion of the Utility authority, standby crews are necessary during blasting operations, the Contractor shall make the necessary arrangements with the Utility authority and the cost of such crews and equipment shall be billed to the Contractor by the Utility authority. These measures will apply to those utilities located within all blasting areas.
 - .3 The Contractor shall notify in writing the appropriate Utility Companies of construction commencement, with a copy submitted to the Contract Administrator within 3 business days of being granted permission to start work.
 - .4 The Contractor shall notify the appropriate Utility Companies one week in advance of any rock blasting, with a copy submitted to the Contract Administrator within 3 business days.
 - .2 Adjacent Structures and Utilities
 - .1 Perform temporary and permanent support and temporary relocation and replacement of underground or overhead utilities.
 - .2 Permanent relocation of underground or overhead utilities will be carried out by others, if necessitated by coincidence of lines or grades.
 - .3 Existing Drainage and Water Supply
 - .1 Maintain temporary and permanent flow in all sewers, water mains, drains, gutters, ditches, watercourses, house and inlet connections.
 - .2 Maintain the flow in and from the existing utility mains and services by whatever means or material that is necessary until the Consultant permits the use of the constructed main. Include all cost for maintaining flow in the tender prices for sewer and water pipe construction related items.
 - .4 Support of Permanent Underground Utilities

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- .1 Where permanent pipes are uncovered or during the construction of new systems, it is found that the pipes cross each other, the Consultant may direct that concrete be placed to provide support for the pipes. The concrete shall be placed as directed and in locations as determined by the Consultant. The concrete shall be measured in place and payment made in accordance with the allowances of the contract.
 - .2 Where permanent existing services have been uncovered during excavation of trenches for installation of utility mains the Consultant may require a 50 mm x 150 mm creosote wood plank be placed under each pipe on a thoroughly compacted bed throughout the entire width of excavation so that this pipe is fully supported by the timber. Sand cushion material shall be surrounding each pipe and be of no less than 150 mm thickness from the outside diameter of the pipe, hand compacted and backfilled as directed by the Contract Administrator. Wooden planks to be provided by the Town.
 - .3 Place concrete in accordance with the direction of the Consultant. Supply and place concrete in accordance with OPSS 904.
 - .5 Support Of Gas Pipelines
 - .1 General
 - .1 This following applies to all excavations of gas company underground plant.
 - .2 Gas pipelines shall be supported at all times to prevent damage to the pipeline from deflection due to its own weight plus any other load that may be imposed on it.
 - .2 Temporary Support
 - .1 A suitable method of supporting gas pipelines shall be used when an excavation will result in unsupported pipe spans exceeding the maximum spans permitted by the gas company. Provide suitable, temporary support acceptable to the gas company.
 - .2 Temporary support shall remain in place until permanent support is provided and shall be inspected at least every three weeks by personnel from the gas company.
 - .3 Permanent Support
 - .1 Permanent support of a gas pipeline shall be provided by either a properly compacted backfill method or a structural method. A properly compacted backfill method is preferred.
 - .2 Where proper support cannot be provided with backfill material, permanent structural supports shall be installed. The appropriate gas authority shall provide some typical designs. Where these designs are not suitable, the Engineer shall be consulted for a custom design.
 - .6 Protection and Locations
 - .1 Prior to commencing any excavation work, notify applicable utility authorities, establish location and state of use of buried services. Clearly mark such locations to prevent disturbances during work.
 - .2 Maintain and protect from damage, water, sewer, gas electric or other utilities encountered.
 - .3 Obtain direction of Owner of utility and Consultant before moving or otherwise disturbing utility.
 - .4 Utilities that require permanent relocation will be the responsibility of the utility company concerned at no expense to the Contractor. Co operate with the utility companies who shall have free access to their plant at all times.
 - .5 Where existing pipes, ducts, or other underground services intersect the pipe trench, support the pipe trench to the approval of the Consultant and the utility company.
 - .6 Where existing overhead poles are adjacent to the excavation, temporarily support them to the approval of the Consultant and the utility company concerned.
 - .7 Notify Fire Department of any planned or accidental interruption of water supply to hydrants.
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- .8 The position of all pole lines, conduits, watermains, sewers and other underground and overground utilities and structures is not necessarily shown on the contract drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed and the Owner disclaims, on behalf of himself and those responsible for such drawings, all liability with respect to same. Before starting work, the Contractor shall inform himself of the exact locations of such utilities and structures, and shall be liable for damages to them as a result of any act or omission, whether or not the result of negligence, by those for whom he is responsible. The Contractor waives any claim and releases the Owner and the agents of the Owner from all liability for damages suffered as a result of such contract drawings. Size, depth and location of existing utilities as shown is for guidance only; completeness and accuracy of information is not guaranteed.
- .9 Protect existing buildings, trees and other plants, lawns, fencing, service poles, wires or paving located within right of way or adjoining properties from damage while work is in progress and repair damage resulting from work.
- .10 Where excavation necessitates root or branch cutting, do so only under direct control of the Consultant.
- .11 Whenever shoring, sheeting, timbering and bracing of excavations is required, engage services of a Professional Engineer to design and assume the responsibility for adequacy of shoring and bracing. Professional Engineer to be registered in province of territory in which work is to be carried out.
- .12 When requested, submit for review, drawings and calculations signed and stamped by Professional Engineer responsible for their preparation. Close sheeting, when required, to be designated and constructed to prevent adjacent soil or water from entering excavation.
- .13 Maintain unobstructed access to fire and police appurtenances, telephone, electric, water, sewer, gas, or other public utilities and private properties.
- .14 Immediately take all necessary action for the repair of damaged utilities and pay all cost for the repair work.
- .15 Refer to existing utility information that may be contained in this Contract.
- .7 Private Lands
 - .1 The Contractor shall not enter upon or occupy with men, equipment or materials of any nature or store any materials on any private property unless he has obtained a consent from the property owner and a copy of such consent has been furnished to the Consultant.
 - .2 Any resulting costs for occupying private lands shall be at the Contractor's expense.

1.15 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Open fires and burning of rubbish are not permitted on the site.
- .3 Fire Routes
 - .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.16 FIRST AID

- .1 The Contractor shall provide and maintain on the site where construction is being carried out, completely equipped first aid facilities in a clean orderly condition, which shall be readily accessible at all times to all his employees and the Consultant and his staff.

- .2 The Contractor shall designate certain employees who are properly instructed to be in charge of first aid. At least one such employee shall always be available on the site while work is being carried on.
- .3 A telephone call list for summoning aid such as doctors, ambulances, and rescue squads from outside sources shall be conspicuously posted.

1.17 PROTECTION OF FINISHES WORK & EQUIPMENT

- .1 Provide necessary screens, covers, hoardings as required.
- .3 Be responsible for damage incurred due to lack of or improper protection.
- .4 Make good all damaged existing work required to be damaged to facilitate new work covered under this contract.

1.18 SECURITY

- .1 Decision to provide security personnel resides solely with the Contractor.

1.19 SPILLS REPORTING

- .1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Engineer. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1980.
- .2 All spills or discharge of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.
- .3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.20 PROTECTION OF WATER QUALITY

- .1 At all times, the Contractor shall maintain existing stream flows and shall control all construction work so as not to allow sediment or other deleterious materials to enter streams.
- .2 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses but shall be diffused onto vegetative areas a minimum of 30 metres from the watercourse. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geotextile coverage will be required.
- .3 If dewatering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from the watercourses and not pumped directly into the watercourses.
- .4 No machinery shall enter the creek bed of any watercourse. Movement of construction equipment in the vicinity of any creek shall be limited to the minimum required for construction.

- .5 The Contractor shall not carry out equipment maintenance or refueling or store fuel containers within 100 metres of any watercourse. The Contractor shall not stockpile construction debris or empty fuel/pesticide containers within the Contract limits.

1.21 SITE OFFICES

- .1 Provide a temperature controlled and ventilated office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide and maintain in clean condition during progress of Work, adequately lighted, heated and ventilated Contractor's office with space for filing and layout of Contract Documents and contractors normal site office staff, and site meetings.
- .3 Provide adequate required first aid facilities.
- .4 Subcontractors may provide their own offices as necessary. Direct the location of these offices.

1.22 EQUIPMENT/TOOL/MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause the least interference with work activities.

1.23 CONSTRUCTION SIGN

- .1 Erect Owner, Consultant and Ministry of Education project signs, in location(s) as designated by the Consultant.
- .2 Provide lumber framing as required to provide secure, wind resistant installation. Brace as required.
- .3 Maintain sign in good condition for the duration of Work. Clean periodically.

1.24 PROJECT CLEANLINESS

- .1 Maintain the Work in tidy condition, free from the accumulation of waste products and debris.
- .2 Remove waste material and debris from the site and deposit in waste container at the end of each working day.
- .3 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.25 WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

- .1 Reporting
 - .1 Prior to the commencement of work, the Contractor shall provide, to the Consultant, a list of those products controlled under the WHMIS, which he expects to use on the contract. Related Material Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labeled.
 - .2 The Contractor shall notify the Consultant of changes to the list in writing and provide relevant material Safety Data Sheets.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 National Building Code of Canada (2010)
- .2 National Fire Code of Canada (2007)
- .3 Ontario Fire Code (2007)
- .4 Guidelines for Maintaining Fire Safety during Construction in Existing Buildings, (10/31/88) Ontario Ministry of the Solicitor General, Office of the Fire Marshal.
- .5 Ontario Building Code (Regulation 350/06)

1.2 FIRE SAFETY

- .1 Fire Fighting Equipment
 - .1 Provide and maintain in working order, ULC labeled, 9kg 4A 60BC type fire extinguishers, and locate in prominent positions to approval of authorities having jurisdiction.
- .2 Fire Department Access
 - .1 Provide and maintain fire access routes as designed, as soon as construction sequence will allow. Access routes must have compacted granular sub base, in place before superstructure of building may proceed.
 - .2 Construction activities must not obstruct access routes designated for fire department equipment. If necessary that existing access be obstructed or deleted, alternative access, acceptable to the fire department, must be provided prior to commencement of construction, in accordance with Ontario Building Code location and design criteria for required access routes.
- .3 Control of Combustible Materials
 - .1 The stockpiling of construction materials adjacent to the existing building must be carefully controlled in accordance with the Ontario Fire Code. Materials stored, and their proximity to, equipment used in construction may create a fire hazard. Control of combustibles on a construction site is regulated under the Occupational Health and Safety Act.
- .4 Hot Work
 - .1 Conform to the requirements of the Occupational Health and Safety Act – Regulations for Construction Projects.
 - .2 Provide all necessary guards and barriers to protect workers, property, and the public when performing hot work such as torching, cutting or coring. Protect all adjacent combustible materials.
 - .3 Provide a "Fire Watch" for a minimum of 3 hours after each instance of discontinuing hot work.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 805, Construction Specification for Temporary Erosion and Sediment Control Measures
 - .2 OPSS 804, Construction Specification for Seed and Cover
- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size
- .2 ASTM International
 - .1 ASTM D4491-D4491M-15, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D4716-14, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Erosion and Sedimentation Control Plan (ESCP): submit 1 copy of ESCP plan to Contract Administrator before first project meeting.
 - .1 The ESCP shall include
 - .1 Written descriptions of measures and drawings including the on-site activities and measures to be used to control erosion and sediment movement for each step of the Work.

- .2 Phasing of the steps for the installation of all control measures including scheduling of inspections.
- .3 Indicate monitoring schedule and maintenance measures.
- .4 Indicate sequence of removal and method of disposal of all installations.
- .2 Submit Manufacturer's Data Sheets for the following products, if applicable:
 - .1 Hydro-Mulch
 - .2 Erosion Control Blankets
- .3 Submit Manufacturer's Material Safety Data Sheets (MSDS) where applicable.
- .4 Weekly reports: refer to section 3.3.2.

1.3 CODES AND STANDARDS

- .1 All construction operations that may impact upon water quality shall be carried out in a manner that strictly meets the requirements of all applicable local regulations,
- .2 Where, in the opinion of the Contract Administrator or Regulatory Agency, the installed control measures fail to perform adequately, the Contractor shall supply and install additional or alternative measures as directed by the Contract Administrator or Regulatory Agency. As such, the Contractor shall have additional control materials on site at all times which are easily accessible and may be implemented by him at a moment's notice.
- .3 The Contractor shall ensure that all workers, including sub-contractors, in the Working Area are aware of the importance of the erosion and sediment control measures and informed of the consequences of the failure to comply with the requirements of all Regulatory Agencies and the specifications detailed herein

1.4 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

Part 2 Products

2.1 EROSION & SEDIMENT CONTROL PRODUCTS

- .1 Straw Bales: Straw shall be either wheat or oat straw. Straw bales shall be dry and firm, be tied tightly in at least two places, show no evidence of straw or tie decay, and be free of sediment. They shall be of agricultural, rectangular formation.
- .2 Geotextile:
 - .1 Geotextile for silt fence shall be according to OPSS 1860, Table 3. Geotextile for silt fence may be separate from the stakes used to install it as a sediment barrier.
 - .2 Geotextile for berm barriers and rock flow check dams shall be a woven, Class II geotextile according to OPSS 1860. The filtration opening size (FOS) shall be no greater than 300 µm.

- .3 Turbidity curtain geosynthetics shall have a grab tensile strength of at least 990 N, meeting CAN/CGSB 148.1, No. 7.3 and be one of geotextile or geomembrane. Geotextile shall be a woven material. The filtration opening size (FOS) shall be no greater than 300 µm, meeting CAN/CGSB 148.1, No. 10. Geomembrane shall be a low-permeability synthetic material, or a geotextile impregnated with elastomeric spray.
- .4 Geotextile for filter bags shall be non-woven, polypropylene, Class I according to Table 1 of OPSS 1860 unless otherwise specified.
- .3 Filter stone: crushed gravel stone graded such that 100 percent of material will pass one- inch sieve and not more than five percent will pass ¼ inch sieve.
- .4 Sandbags: Sandbags shall be made from heavy gauge plastic, agricultural burlap, or silt fence geotextile. Heavy gauge plastic shall contain stabilizers or inhibitors resistant to deterioration by ultraviolet radiation. Sandbags shall be filled with clean sand, 19 mm gravel or 6 mm pea gravel, containing no silt or clay.
- .5 Fibre Rolls:
 - .1 Fibre rolls shall be of a consistent internal thickness with even fibre distribution throughout the roll.
 - .2 Fibre rolls shall be covered on the outside with an open-weave, biodegradable and photodegradable mesh or netting that securely contains the fibres within the rolls.
 - .3 Fibre rolls shall be filled with 100% organic, biodegradable material such as shredded straw, wood fibres or compost and may contain seed.
 - .4 No manure, biosolids, toxic substances or man-made foreign matter.

Part 3 Execution

3.1 GENERAL

- .1 Maintain existing flow pattern in natural watercourse systems. Prevent sediment laden runoff from entering any sewer or watercourse within or downstream of the Working Area.
- .2 In natural systems maintain existing riffle pool and step pool patterns.
- .3 In wetland systems, maintain existing hydrological conditions.
- .4 The Contractor shall implement sequential measures arranged in such a manner as to mitigate sediment release from the construction operations and achieve specific maximum permitted criteria where applicable

3.2 EROSION & SEDIMENT CONTROL

- .1 Erosion and Sediment Control shall be installed to OPSS 805, and may include:
 - .1 Filter bags and rolls.
 - .2 Silt Fences.
 - .3 Straw Bale barriers.
 - .4 Check Dams.

- .5 Seed.

3.3 INSPECTION & MONITORING OF MITIGATION MEASURES

- .1 The Contractor shall be solely responsible for inspecting, monitoring and maintaining the effectiveness of the ESC Plan upon implementation.
- .2 The Contractor shall submit to the Contract Administrator bi-weekly inspection reports demonstrating the performance of the installed measures, identifying deficiencies and identifying required maintenance issues. These reports shall be prepared, signed by an authorized person and provided to the Contract Administrator within 48 hours of the inspection.
 - .1 The date and time of the inspection and monitoring.
 - .2 General description of the mitigating measures being utilized at the site.
 - .3 Confirmation as to the effectiveness of the measures inspected.
 - .4 Description of any maintenance issue which requires minor repair, improvement or maintenance.
 - .5 Description of any deficiency observed including timeline for correction and re-inspection.
 - .6 Deficiency re-inspection reports outstanding for the site.
- .3 Deficiencies are defined as any measure or lack of measure which has potential to cause an adverse environmental impact at the site given the current/ forecasted conditions and schedule of the work.
- .4 Maintenance issues which have previously been identified but not adequately corrected shall be considered deficiencies.

3.4 CONTROL MEASURE REMOVAL

- .1 The sediment control measures shall only be removed when, in the opinion of the Contract Administrator, the measure or measures, is no longer required. No control measure may be permanently removed without prior authorization from the Contract Administrator.
- .2 Ditch, permanent slope, and any other embankment cover specified elsewhere in the Contract Documents to be placed within the area controlled by the temporary erosion and sediment control measure shall be in place and established prior to the removal of such control measure.
- .3 Temporary erosion and sediment control measures shall be removed, and associated excavations backfilled and compacted when the measures are no longer required.
- .4 Temporary erosion and sediment control measures shall be removed in a manner that:
 - .1 Prevents entry of equipment, other than hand-held equipment or boats, to any waterbody
 - .2 Prevents release of sediment and debris to any waterbody
- .5 Prior to removal of the in-water control measures, the area enclosed by turbidity curtains and check dams shall be cleaned of all debris

- .6 Any seeding and mulching, temporary cover, sod, other surface application, or original turf cover disturbed by removal or backfilling of erosion and sediment control measures and removal of accumulated sediment, shall be brought to final grade and restored.

3.5 QUALITY CONTROL

- .1 The Contractor shall monitor runoff quality and quantity of water discharged from dewatering operations.
- .2 Where, in the opinion of either the Contract Administrator or a Regulatory Agency, any of the terms specified herein have not been complied with or performed in a suitable manner, or at all, the Contract Administrator or Regulatory Agency has the right to immediately withdraw its permission to continue the work but may renew its permission upon being satisfied that the defaults or deficiencies in the performance of this specification by the Contractor have been remedied. No compensation will be owed or paid to the Contractor for the withdrawal of permission to do the work resulting from non-compliance with the requirements of this specification or the Regulatory Agencies.
- .3 In addition to any other remedy and/or penalty provided by law, where there has been default or non-compliance with any of the terms specified herein and the Contractor refuses to perform or rectify same within forty-eight (48) hours of the receipt of the written demand of the Contract Administrator to do so, the Town of Marathon is hereby entitled to enter upon the Working Area and either complete the work in conformity with the Contract or have the work done that it considers necessary to complete the Work to its intended condition, whichever, in the sole opinion of Town of Marathon staff, is the most reasonable course of action. The Contractor and the Town of Marathon further agree that the costs incurred for any such work shall be retained from monies otherwise due to the Contractor, should any such monies be available.

3.6 WASTE MANAGEMENT AND SEDIMENT DISPOSAL

- .1 Sediment that is accumulated by the temporary erosion and sediment control measures shall be removed periodically in a manner that avoids escape of the sediment to the downstream side of the control measure and avoids damage to the control measure.
- .2 The sediment shall be removed from the site at the Contractor's expense. Sediment management measures shall comply with all applicable local regulations.
- .3 The Contractor shall immediately report to the Contract Administrator and City representatives any accidental discharges of sediment material into either the watercourse or the storm sewer system. Failure to report will be constitute a breach of this specification and the Contractor may also be subject to the penalties imposed by any applicable Regulatory Agency.
- .4 Sediment shall be removed to the level of the grade existing at the time the control measure was constructed and be according to the following:
 - .1 For sediment barriers and flow check dams, accumulated sediment shall be removed once it reaches a depth of one-half the effective height of the control measure. For flow check dams, the effective height shall be determined relative to the lowest point of the flow check dam.

-
- .2 For all control measures, accumulated sediment shall be removed as necessary to perform maintenance repairs.
 - .3 Accumulated sediment shall be removed immediately prior to the removal of the control measure
 - .5 Separate waste materials for recycling at approved facilities where applicable.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 Quality Control.

1.3 REFERENCE STANDARDS

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2 2008, Stipulated Price Contract.
- .2 Within the text of the specifications, reference may be made to the following standards:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials
CEC	Canadian Electrical Code including Ontario Supplement (published by CSA)
EEMAC	Electrical and Electronic Manufacturers Association of Canada
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CLA	Canadian Lumberman's Association
CPCA	Canadian Painting Contractors' Association
CPCI	Canadian Prestressed Concrete Institute
CRCA	Canadian Roofing Construction Association
CSA	Canadian Standards Association
FM	Factory Mutual Engineering Corporation
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
NAAMM	National Association of Architectural Metal Manufacturers
NBC	National Building Code
NEMA	National Electrical Manufacturers Association
OPSD	Ontario Provincial Standards for Roads & Municipal Services
TTMAC	Terrazzo, Tile and Marble Association of Canada
ULC	Underwriters' Laboratories of Canada

- .3 Conform to these standards, in whole or in part as specifically requested in specifications.
- .4 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .5 The cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non conformance.
- .6 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 QUALITY

- .1 Refer to CCDC 2, GC 3.8.
- .2 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with

- specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
 - .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
 - .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
 - .7 Wherever a Product or manufacturer is specified by a single proprietary name, provide the named Product only.
 - .8 Wherever more than one Product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.

1.5 AVAILABILITY

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

1.6 STORAGE, HANDLING AND PROTECTION

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

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re installation at no increase in Contract Price or Contract Time.

1.9 QUALITY OF WORK

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

1.10 CO ORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.12 REMEDIAL WORK

- .1 Refer to CCDC 2, GC 3.13 and Section 01 70 00 Execution.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Consultant of conflicting installation. Install as directed.

1.14 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.15 FASTENINGS AND EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.16 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.

1.17 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Field survey services to measure and stake site.
- .2 Survey services to establish and confirm inverts for work.
- .3 Recording of subsurface conditions found.

1.2 REFERENCES

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

1.3 QUALIFICATIONS OF SURVEYOR

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

1.4 SURVEY REFERENCE POINTS

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

1.5 EXISTING SERVICES

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

1.6 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate
- .2 Relocate electrical outlets up to 1.5m from location indicated at no extra cost.
- .3 Relocate diffusers up to 600mm from location indicated at no extra cost.
- .4 Relocate any suspended ceiling up or down by 150mm from elevations indicated to suit site conditions at no extra cost.
- .5 Relocate roof hoppers up to 3000mm from location indicated at no extra cost.
- .6 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .7 Inform Consultant of impending installation and obtain approval for actual location.

- .8 Prepare Submit field interference drawings to indicate relative position of various services and equipment to ensure proper coordination of all mechanical and electrical services at no additional cost.

1.7 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.8 SUBMITTALS

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

1.9 SUBSURFACE CONDITIONS

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

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

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

1.2 CLEANING DURING CONSTRUCTION

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.

1.3 WASTE MANAGEMENT

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
- .2 Fires and burning of rubbish or waste on site is prohibited.
- .3 Burying of rubbish or waste materials, except as specified herein, is prohibited.
- .4 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .5 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris.

1.4 FINAL CLEANING OPERATIONS

- .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
- .3 Remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris.

- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .6 Cleaning operations shall include the removal of all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections.
- .7 Remove all paint spots or overspray from all affected surfaces.
- .8 Clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials.
- .9 Clean all ceramic tile surfaces in accordance with the manufacturer's instructions and apply final coat of sealer where specified.
- .10 Clean inside of all millwork and cabinetry.
- .11 Broom clean and spray wash all exterior paved surfaces.
- .12 Remove dirt and other disfiguration from exterior surfaces.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Closeout Submittals Section 01 78 00

1.2 INSPECTION AND DECLARATION PROCEDURES

- .1 Arrange for, conduct and document final inspections, close-out and commissioning at the completion of the Work in accordance with procedures described in these documents.

1.3 SUBSTANTIAL PERFORMANCE

- .1 Contractor's Inspection
 - .1 Refer to OAA/OGCA Document 100 – STAGE 2.
 - .2 The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects, and make corrections as required to conform with the Contract Documents. Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.
- .2 Contractor's Application for Substantial Performance of the Work
 - .1 Refer to OAA/OGCA Document 100 – STAGE 3.
 - .2 When the Contractor has carried out the steps in Stage 2 of OAA/OGCA Document 100 and has determined that the requirements of the Contract have been substantially performed as defined by local Lien legislation, the Contractor shall make application for Substantial Performance of the Work.
 - .3 In addition to the requirements of OAA/OGCA Document 100, the following items shall accompany the Contractor's application for Substantial Performance. These items must be complete in all respects, and all verification certificates and reports having been submitted and approved by the Consultants:
 - .1 Completed Maintenance Manuals for all disciplines (No. of copies as specified),
 - .2 As-Built Drawings for all disciplines (No. of copies as specified),
 - .3 Mechanical, and Electrical as-built CAD drawings,
 - .4 Plumbing Inspection,
 - .5 Domestic Water Quality Test Report,
 - .6 Mechanical start-up reports
 - .7 Electrical distribution system inspection,
 - .8 ESA Hydro Certificate,
 - .9 Commissioning, except for functional testing and controls training, unless approved in writing by the Owner's Project Manager.
- .3 Consultant's Inspection
 - .1 The Consultants shall perform an inspection of the Work to assess the validity of the Contractors application, and shall identify in separate lists, unfinished work and deficiencies. Contractor shall correct work accordingly.
- .4 Certificate of Substantial Performance

- .1 Refer to OAA/OGCA Document 100 – STAGE 4.
- .2 Should the Consultant concur with the Contractor's application for Substantial Performance, the Consultant shall notify the Contractor of approval of the application for Substantial Performance and issue a Certificate of Substantial Performance.
- .3 The Contractor shall publish a copy of the Certificate of Substantial Performance in a construction trade newspaper and shall provide the Consultant with proof of the date of publication.

1.4 LIEN PERIOD AND RELEASE OF ASIC HOLDBACK

- .1 Refer to OAA/OGCA Document 100 – STAGE 5.
- .2 Commencement of Lien and Warranty Periods
 - .1 The day following the date of publication of Certificate of Substantial Performance shall be the date of commencement of the Warranty Period, and of the 60 day Lien Period prior to release of basic holdback, unless required otherwise by lien statute of the Place of the Work.
 - .2 When the Contractor has carried out the required steps in Stages 3 and 4 of OAA/OGCA Document 100, the Contractor shall make application for Release of Basic Holdback.
 - .3 The Consultant shall prepare the Certificate for Payment for release of basic holdback, and promptly upon receipt of the necessary documentation, issue the Certificate for Payment to the Owner.

1.5 FINAL INSPECTION AND PAYMENT

- .1 Refer to OAA/OGCA Document 100 – STAGE 6.
- .2 Submit a signed statement stating following have been performed:
 - .1 Work has been reviewed for compliance with Contract Documents,
 - .2 All deficiencies have been corrected,
 - .3 All unfinished work has been completed, and
 - .4 Work is complete and ready for Final Inspection.
- .3 Commissioning Prerequisites To Final Completion
 - .1 All TAB work and the commissioning must be complete prior to Functional Completion, unless approved in writing by the Owner's Project Manager. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:
 - .1 Completed and signed start-up and pre-functional checklist documentation
 - .2 Requested trend log data
 - .3 Completion of all functional testing
 - .5 Required training of Owner personnel completed and approved
 - .6 Submission of the approved O&M manuals
 - .7 All identified deficiencies have been corrected or are approved by the Owner to be excepted from this milestone
- .4 When items noted above are completed, a final inspection of the Work will be performed by the Owner, the Consultants, and the Contractor.
- .5 If the Work is deemed to be incomplete, complete outstanding items and request

a reinspection.

- .6 If the Work is deemed to be complete, the Consultant will issue a Final Certificate for Payment.

1.5 INSPECTION AND REVIEW BEFORE READY-FOR-TAKEOVER

- .1 Contractor's Inspection: Before applying for the Consultant's review to establish Ready-for-Takeover of the Work:
 - .1 Ensure that the specified prerequisites to Ready-for-Takeover of the Work are completed.
 - .2 Conduct an inspection of the Work to identify defective, deficient, or incomplete work.
 - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
 - .4 Provide an anticipated schedule and costs for items to be completed or corrected.
- .2 Consultant's Review: Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected, the Consultant and the Contractor shall arrange a mutually satisfactory agreed date and time to jointly review the Work. The Consultant will advise the Contractor whether or not the Work is Ready-for-Takeover. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Consultant with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The Contractor's inspection and Consultant's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on the Contractor's list of items to be completed or corrected.
- .4 When the Consultant determines that the Work is Ready-for-Takeover, the Consultant will notify the Contractor and the Owner in writing to that effect.
- .5 The first review will be undertaken only if the Contractor has inspected the Work, and states in writing that the unfinished work noted in their application for Substantial Performance has been completed, and at least 50% of all deficiencies have been corrected.
- .6 The second review will be undertaken only if the Contractor has inspected the Work, and states in writing that 90% of the deficiencies have been corrected.
- .7 If the Consultants determine during either review that the above noted criteria for progress have not been met, they may terminate the deficiency review.

1.6 PREREQUISITES TO FINAL PAYMENT

- .1 After Ready-for-Takeover of the Work and before submitting an application for final payment in accordance with the General Conditions of Contract:
 - .1 Correct or complete all remaining defective, deficient, and incomplete work.
 - .2 Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and Temporary Work.
 - .3 Perform final cleaning and waste removal necessitated by the

Contractor's work performed after Ready-for-Takeover, as specified in
Section 01 74 00 – Cleaning and Waste Management.

1.7 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 The prerequisites to, and the procedures for, attaining substantial performance of the Work, or similar such milestone as provided for in the lien legislation applicable to the Place of the Work, shall be:
 - .1 independent of those for attaining Ready-for-Takeover of the Work, and
 - .2 in accordance with the lien legislation applicable to the Place of the Work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 As built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 45 00 Quality Control.
- .4 Section 01 77 00 Closeout Procedures.

1.3 SUBMISSION

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned, with Consultant comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, (3) final copies of operating and maintenance manuals in English.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.

1.4 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 D-ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 A copy of all data to be submitted in format copied on to a CD or USB key.

1.5 CONTENTS, EACH VOLUME

- .1 Table of Contents: provide title of project.
 - .1 date of submission; names,
 - .2 addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 schedule of products and systems, indexed to content of volume.
- .2 For each product or system:

- .1 list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 Quality Control.

1.6 AS BUILT AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Consultant and Owner, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the 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. 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. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of opaque drawings, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with data and tests, and complete nomenclature and commercial number of replaceable parts.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start up, break in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .13 Include test and balancing reports as specified in Section 01 45 00 Quality Control.
- .14 Additional requirements: As specified in individual specification sections.

1.10 MATERIALS AND FINISHES

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

1.11 SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.13 SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.14 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.15 WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 - Basic Product Requirements
- .2 Section 03 20 00 - Concrete Reinforcement
- .3 Section 04 05 13 - Mortar and Masonry Grout
- .4 Section 04 05 19 - Masonry Reinforcing and Connectors
- .5 Section 04 05 23 - Masonry Accessories.
- .6 Section 07 92 00 - Joint Sealers.

1.2 REFERENCES

- .1 CSA-A165 Series, Standards on Concrete Masonry Units.
- .2 CSA A179, Mortar and Grout for Unit Masonry.
- .3 CAN3 A371, Masonry Construction for Buildings.
- .4 CSA-A370 Connectors for Masonry

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00
- .2 Submit samples:
 - .1 Two of each type of masonry unit and concrete stone specified.
 - .2 One of each type of masonry accessory specified.
 - .3 One of each type of masonry reinforcement, tie and connector proposed for use.
 - .4 As required for testing purposes.

1.4 TEST REPORTS

- .1 Submit laboratory test reports in accordance Section 01 33 00
- .2 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
- .3 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.

1.5 JOB MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up panel of exterior masonry wall construction section 04 22 00 showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, windowsills, mortar and workmanship.
- .3 When accepted, mock-up will demonstrate minimum standard for this work. If acceptable mock-up may remain as part of finished work.
- .4 Schedule to be ready for consultants review at same time all mock-up requested.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to job site in dry condition.
- .2 Keep materials dry until use except where wetting of bricks is specified.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Cold weather requirements
 - .1 Supplement Clause 5.15.2 of CSA-A371 with following requirements:
 - .1 Maintain temperature of mortar between 5°C and 50°C until batch is used.
 - .2 Hot weather requirements
 - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
 - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
 - .3 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
 - .4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

2 PRODUCTS

2.1 MATERIALS

- .1 Masonry materials are specified in related Sections indicated in 1.1.

3 EXECUTION

3.1 INSTALLATION

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.1 CONSTRUCTION

- .1 Exposed masonry
 - .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.
- .2 Jointing
 - .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.
 - .2 Strike flush all joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
- .3 Cutting
 - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
 - .2 Make cuts straight, clean, and free from uneven edges.
- .4 Building-In
 - .1 Build in items required to be built into masonry.

- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
- .4 Provide interference drawings of all build in items and document as per Section 01450 Quality Control / Quality Assurance.
- .5 Wetting of bricks
 - .1 Except in cold weather, wet bricks having an initial rate of absorption exceeding 1 g/minute/1000 mm²: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
 - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
- .6 Support of loads
 - .1 Use concrete to Section 03300 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units use 35 Mpa
 - .2 Use grout to CSA A179 where grout is used in lieu of solid units.
 - .3 Install building paper below voids to be filled with grout; keep paper 25 mm back from faces of units.
- .7 Provision for movement
 - .1 Leave 20 mm space below shelf angles.
 - .2 Leave 20 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
 - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .8 Lateral Support:
 - .1 Provide lateral support at horizontal and vertical intervals of no more than:
20 times wall thickness for walls of solid units.
18 times wall thickness for walls of hollow units.
36 times wall thickness for partitions.

3.1 SITE TOLERANCES

- .1 Tolerances in notes to Clause 5.3 of CSA-A371 apply.

3.2 RE-INSTALLATION

- .1 Cut openings in existing work as indicated.
- .2 Openings in walls to be approved by Consultant.

3.3 FIELD QUALITY CONTROL

- .1 Inspection and testing will be carried out by Testing Laboratory designated by Consultant.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 - Basic Product Requirements
- .2 Section 04 00 00 - Masonry Procedures.

1.2 REFERENCES

- .1 CSA A179, Mortar and Grout for Unit Masonry.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit 75 x 10mm thick samples of grey mortar.

2 PRODUCTS

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
 - .1 Mortar as per masonry manufacturers recommendations
- .3 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .4 Colour: Premeasured units of pure metallic oxide pigments to ASTM C979 "Interstart" or approved equal. Colour to consultants selection post tender.
- .5 Mortar for exterior masonry above grade:
 - .1 Loadbearing: Type S
 - .2 Non-loadbearing: Type N
- .6 Mortar for interior masonry:
 - .1 Non-loadbearing: Type N.
- .7 Following applies regardless of mortar types and uses specified above:
 - .1 Mortar for calcium silicate brick and concrete brick: Type O
 - .2 Mortar for stonework: Type N.
 - .3 Mortar for grouted reinforced masonry: Type S.
- .8 Non-staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.
- .9 Parging mortar: Type N to CSA A179.

2.2 MIXES

- .1 Mix grout to semi-fluid consistency.
- .2 Pointing mortar: Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

3 EXECUTION

3.1 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise. Application to follow masonry manufacturers guidelines.
- .2 Apply parging in uniform coating not less than 10 mm thick to all exposed exterior concrete and concrete unit masonry to minimum 150mm below finished grade.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 04 00 00 - Masonry procedures
- .2 Section 04 05 13 - Mortar and Grout
- .3 Section 04 05 23 - Masonry Accessories
- .4 Section 04 05 19 - Masonry reinforcing and connectors

1.2 REFERENCES

- .1 Ontario Building Code.
- .2 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.
- .3 ASTM International, (ASTM)
 - .1 ASTM C90-12 Standard Specification for Loadbearing Concrete Masonry Units.
 - .2 ASTM C129-11 Standard Specification for Nonloadbearing Concrete Masonry Units.
 - .3 ASTM C150/C150M-12, Standard Specification for Portland Cement
 - .4 ASTM C207-06 (2011) Standard Specification for Hydrated Lime for Masonry Purposes.
 - .5 ASTM D2240-05(2010) Standard Test Method for Rubber Property—Durometer Hardness.
 - .6 ASTM D5249-10 Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.
- .4 Canadian Standards Association
 - .1 CSA A23.1-09, Concrete Materials and Methods of Concrete Construction.
 - .2 CAN/CSA A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units.
 - .3 CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry,
 - .4 CAN3-A370-04 (2009) Connectors for Masonry.
 - .5 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.
 - .6 CSA S304.1-04 (R2010), Masonry Design for Buildings.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .3 Acoustic Block: Submit product literature, certifications and test reports.
- .4 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
- .5 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.
- .6 Test reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

- .7 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .8 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.

1.4 COLD WEATHER REQUIREMENTS

- .1 Provide heat enclosures and heat as required.
- .2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.
- .3 Maintain temperature of mortar between 5°C and 50°C until batch is used.

1.5 HOT WEATHER REQUIREMENTS

- .1 Protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

1.6 PROTECTION

- .1 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete Block (Interior Walls: Modular, conforming to CAN3-A165-M Series-M85, Concrete Masonry units and per the following characteristics:
 - 1. S/12.5/A/M for block walls exposed on exterior.
 - 2. S/20/A/M, 100% solid for top course of partitions and walls, for all locations where structural members bear on concrete block, and where shown on Drawings.
 - 3. H/7.5/C/M for all other locations.
- .2 Exterior Architectural Loadbearing Concrete Block: to Can CSA A1165.1 standard equal to Permacon Smooth Face Architectural Blocks..
 - .1 Size: metric modular. Refer to drawings and wall/partition types for varying depth thickness
 - .2 Finish: smooth face
 - .3 Type: stretcher units, breaker units corner units where applicable
 - .4 Colour: allow for two (2) colour choices.
- .4 Provide special shapes and sizes shown or specified such as halves, jambs, lintels, solids, corners, bullnose and double bullnose, semi solids, etc.
- .5 All exposed interior standard smooth face concrete masonry units shall have bullnose or double bullnose corners. Refer to general notes on drawings. All outside corner conditions must be bullnosed. All jambs and heads in wall opening must be bullnosed.
- .6 Sizes as indicated on drawings. Architectural drawings generally show extent and size of all concrete masonry units. Structural drawings generally show extent of all load bearing masonry units or otherwise. Structural drawings will govern over architectural drawings in regards to

concrete masonry unit sizes in case of any discrepancies between drawings. Report discrepancies to consultant prior to proceeding with the work.

PART 3 - EXECUTION

3.1 STANDARD PLAIN FACE

- .1 Refer to structural drawings for locations of all load bearing masonry walls. Reinforced masonry construction (Engineered Masonry) as directed by Structural Engineer for these locations.
- .2 Lay block to align plumb over each other with thick ends of webs up. Leave no cells open in exposed work. Reinforce block work as hereinafter specified.
- .3 Minimize cutting block. Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel where cutting is required and for flush mounted electrical outlet, grilles, pipes, conduit, leaving 1/8" (3 mm) maximum clearance.
- .4 Do not wet concrete masonry before or during laying in wall.
- .5 Locate corners accurately.
- .6 Use full bed of mortar for first course. For remaining courses bed face shells and cross and end webs and vertical end joints fully in mortar. Compress end joint mortar.
- .7 Stagger end joints in every course. Align joints plumb over each other in every other course.
- .8 Bond intersecting block walls in alternate courses. Where block work abuts concrete, bond each block course into reglets cast in concrete wall.
- .9 Where exterior wall backup block coursing cannot line up with masonry veneer, bond each block course to such veneer with adjustable reinforcement.
- .10 Do not break bond of corridor walls or other walls of exposed units where partitions intersect and if bonding would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.
- .11 For cavity wall, construct inner wythe to full required or panel height with full joints struck flush on cavity side before proceeding with balance of cavity wall construction.
- .12 Joints:
 - .1 Exposed block: compressed and tooled concave.
 - .2 Concealed block surfaces: compressed and struck flush with face of masonry.
 - .3 Coursing height: 200 mm nominal for one block and one joint. Carefully establish vertical and horizontal coursing before laying units to ensure correct opening heights and locations, proper elevations, proper elevation for elements bearing on masonry and to prevent undue cutting.
 - .4 Where block is exposed or painted lay blockwork with all joints uniform and carefully pointed. Carefully lay block behind scheduled ceramic wall tile to minimize thickness of parging plaster required to true up surface.

3.2 PARTITIONS

- .1 Carry partitions up through ceiling to structure above, unless noted or specified otherwise.
- .2 Terminate through partitions within 19 mm of structure above, i.e., floor or roof decking

depending under which partitions occur, and where such partitions occur directly under and parallel to structural framing carry these partitions up to within 19 mm of bottom of such structural framing.

- .3 Where walls and partitions are pierced by structural members, duct, pipes, fill voids with mortar to within 19 mm of such members flush with wall finish.
- .4 Fill spaces between partitions and structure, ducts and pipes in accordance with the requirements of Section 07 84 00, Firestopping and Smoke Seals at rated partitions fill spaces at non-rated partitions with acoustic batt insulation including voids at top of partition and metal deck.
- .5 Wedge and grout loadbearing partitions and walls to underside of structure.

3.4 CLEANING

- .1 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.
- .2 Clean glazed concrete masonry as work progresses using soft, clean cloths, with few minutes after laying. Upon completion, when mortar has set so that it will not be damaged by cleaning, clean with soft sponge or brush, and clean water. Polish with soft, clean cloths.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete: Installation of anchors.
- .2 Section 04 05 19 - Masonry Reinforcement and Connectors: Installation of anchors.
- .3 Section 05 12 23 - Structural Steel for Buildings.
- .4 Section 05 51 00 - Metal Stairs and Ladders.
- .5 Section 09 91 00 - Painting

1.2 REFERENCES

- .1 The Ontario Building Code.
 - .1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
- .2 ASTM International, (ASTM)
 - .1 ASTM A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
 - .2 ASTM A123/A123M-12 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M-09 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
 - .4 ASTM A307-10 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .5 ASTM A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .6 ASTM A385/A385M-11 Standard Practice for Providing High Quality Zinc Coatings (Hot Dip).
 - .7 ASTM A570, Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
 - .8 ASTM A1008/A1008M-12 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
 - .9 ASTM A1011/A1011M-12a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
 - .10 ASTM D6386-10 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .3 Canadian Standards Association (CSA International)
 - .1 CSA G40.20-04/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .2 CSA-S16-09, Design of Steel Structures
 - .3 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA-W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
 - .5 CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding
 - .6 CSA W59-03 (R2008) Welded Steel Construction (Metal-Arc Welding)
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint
 - .3 CAN/CGSB 1.181-99, Ready Mixed, Organic Zinc Rich Coating.
- .5 Canadian Sheet Steel Building Institute (CSSBI)
- .6 Steel Structures Painting Council, Systems and Specifications Manual.

- .1 CISC/CPMA 1-73a, A Quick drying One-coat Paint for Use on Structural Steel.
- .2 CISC/CPMA 2-75, A Quick drying Primer for Use on Structural Steel.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- .3 Drawings shall bear the stamp and signature of a professional engineer registered in the Province of Ontario.

1.4 DESIGN REQUIREMENTS

- .1 Design metal stair, handrail, guardrail, landing and ladder construction and connections to OBC vertical and horizontal live load requirements.
- .2 Stairs shall be designed and constructed to safely sustain a live load of 4.8 kPa evenly distributed over treads and landings with a maximum deflection of L/360. Furnish all supporting members required to connect to the building.
- .3 Design service access ladders, stairs and guards to Ministry of Labour requirements.
- .4 All access ladders shall be designed with the minimum requirements from the drawings and Ontario Building Code Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.

1.5 EXAMINATION

- .1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.6 SHIPPING, HANDLING AND STORAGE

- .1 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.
- .2 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.
- .3 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, enting or coarse grinding.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade300W 350W.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.1 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Bituminous paint: to CAN/CGSB-1.108.

2.2 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

3 EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

END OF SECTION

Part 1 GENERAL

1.1. SUMMARY

- .1 Work of this section includes miscellaneous metal fabrications as detailed on the drawings and specified herein.
- .2 Related Sections: Section 12 93 00 – Site Furnishings

1.2. SUBMITTALS

- .1 Submit shop drawings of all work to the Consultant for review before fabrication.
- .2 Retain a structural engineer registered in the Province of Ontario to prepare shop drawings designated with italics and an asterisk (*) under clause 3.8 hereafter.
- .3 Completely detail items indicating all dimensions and methods of fixing, field jointing, attachment to building structure; size, thickness, gauges of metals and fasteners.
- .4 Submit samples of metal finishes and fabrication to the Consultant for approval, if required.

1.3. QUALITY ASSURANCE:

- .1 All work of this section shall be performed by a contractor experienced in the fabrication and working of metals, including cutting, bending, forming and finishing, using personnel with a minimum of two (2) years proven experience.
- .2 Fabricators of welded construction shall be certified by the Canadian Welding Bureau in accordance with CSA W47.1-1992.
- .3 Workmanship for exposed work to be of the highest quality for exposed architectural metalwork.

1.4. PRODUCT DELIVERY, STORAGE AND HANDLING:

- .1 All Exercise care in storing, handling and erecting all material and support all materials properly at all times so that no piece will be bent, twisted or otherwise damaged structurally or visually.
- .2 Correct damaged material and where damage is deemed irreparable by the Consultant, replace the affected item at no additional expense to the Owner.
- .3 Fabricate large assemblies so they can be safely and easily handled to their place of installation.
- .4 Store assemblies above ground.

1.5. JOB CONDITIONS:

- .1 Coordinate this work with the remainder of the work and exercise the necessary scheduling to ensure that all work is carried out and all items incorporated during the appropriate construction phase.
- .2 Provide items to be built in to those trades affected, along with dimensioned setting drawings, in time to be installed in the work.

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- .3 Protect other sections of the work from damage by this section.

Part 2 MATERIALS

2.1. METALS:

- .1 Metals shall be new and free from defects which may impair their strength, durability or appearance, and shall be alloys of the best commercial quality suitable for the intended use.
- .2 Metals shall possess structural properties to sustain safely the strains and stresses to which they will be subjected.
- .3 Metals shall be free of rust, mill scale and discolouration.
- .4 Miscellaneous Steel Shapes and Plates: Conforming to CAN3-G40.21-M87, Type 300W.
- .5 Seamless Hollow Structural Sections: Conforming to CAN3-G40.21-M87, Type 350W, Class C or H.

2.2. FASTENERS:

- .1 Welding Materials: Conform to CSA Standard W.48 series for welding materials.
- .2 Exposed Fasteners: Of the same material, colour and finish as metal to which they are applied unless otherwise noted, corrosion resistant, properly sized.
- .3 Concealed Fasteners: Stainless Steel where in contact with aluminum. Use stainless steel washers in contact with aluminum under all bolt heads. Where used for exterior work. Corrosion-resistant.
- .4 Screws: Flat head countersunk machine type unless otherwise required.
- .5 Bolts and Nuts: Hexagonal head type unless otherwise required.
- .6 Expansion Bolts: Self-drilling type, heavy-duty, sized to suit design requirement.

2.3. GROUT:

- .1 Nonshrink and nonmetallic, developing a minimum compressive strength of 40 MPa at 28 days.

2.4. FINISH:

- .1 Exterior Steel scheduled to be Stainless Finish to CSA standards.
- .2 Exterior Bronze scheduled to be custom "Dark" in Colour, as approved by Consultant, finish to CSA standards.

2.5. FABRICATION:

- .1 Fabricate all miscellaneous metal work shown and detailed in the drawings and listed in this section in the quantities required.
- .2 Assemble built-up work in the shop and match-mark for correct field erection. Execute work in accordance with reviewed shop drawings.
- .3 All copes, mitres and butt cuts in surfaces exposed to view shall be made with uniform gaps of 3mm (1/8") if detailed to be open joints or in uniform contact if detailed without gaps.
- .4 Weld in such a manner as to avoid distortion, discolouration or damage to the members.
- .5 Weld exposed exterior work continuously to provide a proper weathering seal to prevent leakage and other damage.
- .6 Grind smooth welds where exposed to view.
- .7 Provide all required holes in metalwork for attaching other materials.
- .8 Drill for countersunk screws if exposed to view unless otherwise shown or accepted by the Consultant.
- .9 Locate holes in structural members for connections or for other purposes so as not to cause appreciable reduction in the strength of members.
- .10 Reinforce all work to suit the purpose for which it is intended and to withstand design loads.
- .11 Fabricate work square, true, straight and accurate to detail with sharply, defined profiles.
- .12 Fabricate curved work to smooth, uniform constant radii as detailed.
- .13 Joints in materials shall be cut to form fine hairline joints flush with adjacent surfaces.
- .14 Provide suitable temporary bracing as required to maintain alignment during shipment and erection.

2.6. FINISH PREPARATION:

- .1 Clean metal of all loose mill scale, rust, oil, dirt and all other foreign matter.
- .2 Clean exterior metal to be powder coated in accordance with SSPC-SPI - Solvent Cleaning followed with SSPC SP.6 - Commercial Blast Cleaning.
- .3 Remove or repair sharp edges, burrs, weld spatter and other defects to steel members prior to application of primers.

Part 3 EXECUTION

3.1. INSPECTION:

- .1 Examine and survey the work of other sections upon which the work of this section depends and report any discrepancies to the Consultant.
- .2 Verify that surfaces and conditions are ready to accept the work of this section.
- .3 Beginning of installation means acceptance of existing conditions.

3.2. INSTALLATION / ERECTION:

- .1 Install all work in accordance with CAN3-S16.1-M89.

3.3. CUTTING AND FITTING:

- .1 Do cutting, fitting and drilling as required to install the work and to make connections with adjoining work.
- .2 Joints shall be accurately fitted and rigidly secured to hairline contacts.

3.4. ANCHORAGE:

- .1 Anchor all items securely to supporting members using anchorage methods approved by structural engineer
- .2 Size fasteners in accordance with the manufacturer's directions.
- .3 Locate holes for expansion bolts accurately. Diameter and depth of holes and the methods of anchoring in accordance with the manufacturer's recommendation. Burn or check turned bolt, to prevent nuts from loosening.
- .4 Carry out site welding in such a manner as to prevent damage to adjacent surfaces, and the spread of fire. Keep fire extinguisher on hand during site welding.
- .5 Work shall be fastened in place so that items will not be distorted, finish will not be impaired, nor fasteners overstressed.
- .6 Provide shims, washers and anchors as required to make installation firm, tight, anchored in true alignment, neatly fitted, without distortions, unsightly fastenings and raw edges.
- .7 Grout shall be placed in accordance with the manufacturer's directions. Grout joints shall be levelled with adjacent surfaces.
- .8 Maximum deviation from alignment, level or plumb shall not exceed 1.6mm in 1.0m (1/16" in 3'-0").

3.5. EMBEDMENT (IF SHOP DRAWINGS PERMIT):

- .1 Accurately set all embedded metal in place before the concrete is poured or, subject to approval of the Consultant, recesses may be left in the concrete and the metalwork placed, anchored and grouted in place after the concrete has set.
- .2 Embedment and inserts shall be placed within the following tolerances:

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- .3 Maximum allowable variation of plus or minus 3mm (1/8") from the location shown on the drawings.
 - .4 All exterior embedded steel shall be back-primed.
 - 3.6. ISOLATION OF DISSIMILAR METALS:**
 - .1 Prevent direct contact between dissimilar metals by means of isolating gaskets or a thick coat of bituminous paint.
 - 3.7. CLEANING:**
 - .1 Clean all work of road grime, dirt, oil, grease, dust and filings after it is erected and prior to acceptance.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA G40.20-13/G40.21-13, General requirements for rolled or welded structural quality steel/ Structural quality steel
 - .3 CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel Structures.
 - .4 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum.
 - .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
 - .6 CAN/CSA S136-12, North American Specification for the Design of Cold Formed Steel Structural Members.
- .2 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
- .3 Ontario Provincial Standard Specifications
 - .1 OPSS 721, Construction Specification for Steel Beam Guide Rail and Cable Guide Rail
- .4 Town of Marathon Standard Specifications
 - .1 F-7211, Steel Beam Guide Rail, Cable Guide Rail and delineator posts
- .5 ASTM International
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .3 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A792/A792M-10(2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .5 ASTM D5116-10, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit shop drawings indicating railing height, materials, core thicknesses, finishes, connections, and joints.
 - .2 Indicate weld method of anchorage, supports, and reinforcement details.

- .3 Where railings are specified for sloped pathways and stairs, indicate angle of attachment between top rail and posts.
- .2 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties as requested.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 CODES AND STANDARDS

- .1 Comply with all pertinent building codes, standards and regulations
- .2 Conflicting requirements: the more stringent requirements shall govern conflicts between building codes, standards and regulations, the reference standards or the specifications.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect handrails from damage.
 - .3 Replace defective or damaged materials with new.
- .3 Steel posts damaged through handling or installation shall be repaired or replaced as directed by the Contract Administrator.

Part 2 Products

2.1 MATERIALS

- .1 Hand Rails:
 - .1 Frame: as indicated in detail drawings.
 - .2 Size: as indicated in detail drawings.
 - .3 Grout: non-shrink and non-ferrous.
- .2 Guardrails:
 - .1 Frame: to ASTM A53, as indicated in detail drawings.
 - .2 Size: as indicated in detail drawings.
 - .3 Grout: non-shrink and non-ferrous.

2.2 FABRICATION

- .1 General: Fabricate all items in accordance with the reviewed shop drawings and the referenced standards:
 - .1 Fabricated steel shall be according to CSA G40.20/G40.21.
 - .2 Hot dip galvanized according to CAN/CSA G164.
 - .3 All welding shall be according to CSA W59. All welds shall be continuous.
- .2 Prefabrication: Prefabricate all items, to the extent possible, complete and ready for installation.
- .3 Holes: Make all holes by punching or drilling. Burned holes will not be accepted.
- .4 Cap all exposed ends.

2.3 WELDING

- .1 General: Welds shall be completed in accordance with the details shown on the drawings or as specified.
- .2 Welds, welding equipment, procedures, etc. shall conform to CSA W59, and the National Building Code
- .3 All welding shall be done by personnel qualified in accordance with CSA W47.1-09

Part 3 Execution

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Grading:
 - .1 Level ground along railing area to ensure that finished height of railing is the appropriate distance from the proposed finished grade.

3.3 ERECTION

- .1 Erect fabricated railing with posts plumb and straight regardless of slope. Top rail to be parallel to the finished grade of the adjacent path of travel.
- .2 Set posts and rails at lengths and locations as indicated on drawings and to all

applicable codes.

- .3 Core holes into stone or concrete as indicated. Posts to be anchored with non-shrink, non-ferrous grout.

3.4

CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Clean and trim areas disturbed by operations.
- .3 Touch Up:
 - .1 Clean damaged painted metal surfaces with wire brush removing loose and cracked coatings. Rough edges to be filed or ground prior to painting.
 - .1 Apply two coats of same paint to damaged areas.
 - .2 Clean damaged galvanized surfaces with wire brush removing loose and cracked coatings.
 - .1 Apply 2 coats of organic zinc-rich coating.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 - Basic Product Requirements

1.2 REFERENCES

- .1 ANSI A208.1-1999, Particleboard, Mat Formed Wood.
- .2 CAN/CGSB-11.3-M87, Hardboard.
- .3 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .4 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .5 CSA-B111-1974, Wire Nails, Spikes and Staples.
- .6 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 CSA O121-M1978, Douglas Fir Plywood.
- .8 CAN/CSA-O141-91, Softwood Lumber.
- .9 CSA-O151-M1978, Canadian Softwood Plywood.
- .10 CSA-O153-M1980, Poplar Plywood.
- .11 CAN/CSA-O325.0-92, Construction Sheathing.
- .12 CAN3-O437 Series-93, Standards on OSB and Waferboard.
- .13 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 1991.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

2 PRODUCTS

2.1 FRAMING AND STRUCTURAL MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Glued end-jointed (finger-jointed) lumber NLGA Special Products Standard
- .3 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.

2.2 PANEL MATERIALS

- .1 Canadian softwood plywood (CSP): to CSA-O151, standard construction.

2.3 ACCESSORIES

- .1 Nails, spikes and staples: to CSA-B111.
- .2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer. Explosive activated fasteners are not approved.

2.4 FASTENER FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work interior highly humid areas pressure-preservative fire-retardant treated lumber.
- .2 Stainless steel: use stainless steel 304 alloy for exposed work.

2.5 WOOD PRESERVATIVE

- .1 Treat lumber and plywood to CSA 080.
- .2 Dry material to maximum moisture content of 19%.
- .3 Surface apply coloured preservative to manufacturers directions on all cut surfaces.

3 EXECUTION

3.1 INSTALLATION

- .1 Comply with requirements of OBC supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install sheathing in accordance with manufacturer's printed instructions.
- .5 Install furring and blocking as required to space-out and support casework, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .7 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .8 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .9 Install sleepers as indicated.

3.2 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

- .3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

END OF SECTION

Part 1 GENERAL

1.1. SUMMARY

- .1 Work included: Furnish all labour, materials and equipment necessary and incidental to the supply and placement of landscape carpentry as specified herein and as indicated on the drawings. The work shall include, but shall not necessarily be limited to, the following:
 - .1 Supply and installation of Custom Wood Bench.
 - .2 Supply and installation of Timber Boardwalk.
 - .3 Supply and installation of Wood Decks.
 - .4 Supply and installation of Timber Steps.

1.2. SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings of the details below and provide product data for hardware in accordance with General Requirements Section 01 10 10. All pre-manufactured site furnishing products must be submitted in full size and complete samples to Consultant 60 days in advance of installation. Consultant must approve sample and any relevant colors, finishes and sizes prior to Contractor placing final orders.
 - .1 Custom Wood Bench: Shop drawings shall illustrate details necessary for fabrication and erection of the component parts including location, type, size and detail of all fastening systems.
 - .2 Timber Boardwalk: Shop drawings shall illustrate details necessary for fabrication and erection of the component parts including location, type, size and detail of all fastening systems. Shop drawings shall include footing design stamped and signed by a professional structural engineer registered or licensed in the Province of Ontario for Contract Administrator's review and approval prior to fabrication.
 - .3 Wood Deck: Shop drawings shall illustrate details necessary for fabrication and erection of the component parts including location, type, size and detail of all fastening systems. Shop drawings shall include footing design stamped and signed by a professional structural engineer registered or licensed in the Province of Ontario for Contract Administrator's review and approval prior to fabrication.
 - .4 Timber Steps: Shop drawings shall illustrate details necessary for fabrication and erection of the component parts including location, type, size and detail of all fastening systems.

- .5 Timber Transfer Stations & Steps in Playground Area: Shop drawings shall illustrate details necessary for fabrication and erection of the component parts including location, type, size and detail of all fastening systems.
- .2 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.
- .3 Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.
 - .1 Submit Samples on representative samples of actual wood substrates, 8 inches square.
 - .2 Label each Sample for location and application area.

1.3. PROJECT CONDITIONS

- .1 Do not apply exterior finishes in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

Part 2 MATERIALS

2.1. PRODUCTS

- .1 Lumber Grades: to Conform the NGLA latest edition Standard Grading Rules. All S4S unless otherwise required. Unless otherwise specified herein, the moisture content (MC) at time of installation shall be in accordance with the NLGA current standards.
- .2 Structural lumber, not exposed to view, shall be incised pressure-treated No. 2 Construction Grade, Southern Pine (standard commercial name as per CSA-0141) with the following average maximum moisture contents:
 - .1 Lumber greater than 2" (50mm) in thickness 20%
 - .2 Lumber 2" (50mm) or less in thickness 15%
- .3 Custom Wood Bench: Tight knot, yellow cedar (*Chamaecyparis nootkatensis*), red cedar (*Thuja plicata*), or approved equal, as detailed.
- .4 Timber Boardwalk: Tight knot, red cedar (*Thuja plicata*), or approved equal, as detailed.
- .5 Wood Decks: Tight knot, red cedar (*Thuja plicata*), or approved equal, as detailed.
- .6 Timber Steps: Tight knot, red cedar (*Thuja plicata*), or approved equal, as detailed.
- .7 Timber Transfer Stations & Steps in Playground Area: Tight knot, red cedar (*Thuja plicata*), or approved equal, as detailed.

- .8 All lumber shall be straight, sound, and free of splits, warps, cracks, large knots, and other defects.

2.2. FASTENERS

- .1 General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
- .1 Use fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or ASTM F 2329 unless otherwise indicated.
- .2 For pressure-preservative-treated wood and tropical hardwood, use stainless-steel fasteners.
- .2 Nails: ASTM F 1667.
- .3 Standard in first paragraph below covers power-driven staples, nails, P-nails, and allied fasteners.
- .4 Power-Driven Fasteners: NES NER-272.
- .5 Wood Screws: ASME B18.6.1.
- .6 Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- .7 Carbon-Steel Bolts: ASTM A 307 (ASTM F 568M) with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers all hot-dip zinc coated.
- .8 Stainless-Steel Bolts: ASTM F 593, Alloy Group 1 or 2 (ASTM F 738M, Grade A1 or A4); with ASTM F 594, Alloy Group 1 or 2 (ASTM F 836M, Grade A1 or A4) hex nuts and, where indicated, flat washers.

2.3. FINISHING MATERIALS

- .1 Wood bench finish:
- .1 End sealer: Apply 1 coat of Broda™ Pro-Tek-Tor End Sealer or approved equal.
- .2 Natural oil: Apply 2 coats of Broda™ Pro-Tek-Tor Deck-Rail with 100 series transparent tint or approved equal.
- .3 Clear UV coat: Apply 1 coat of Broda™ Pro-Tek-Tor Deck-Rail Clear UV coat or approved equal.

Part 3 EXECUTION

3.1. INSTALLATION

- .1 Install members to lines, levels and elevations indicated. Space members uniformly.
- .2 Use hot-dipped galvanized or approved non-corrosive fasteners.

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- .3 Install required steel connectors; all to be stainless steel unless otherwise indicated.
 - .4 Groove or rout wood members to accept light fixtures as detailed.
 - .5 Upon completion, remove from the site all waste and residue from work of this section.

3.2. FINISHING

- .1 Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
 - .1 Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - .2 Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
 - .3 Allow wood to dry completely for at least 24 to 48 hours.
- .2 Apply end sealers to all cut ends immediately after cutting, in accordance with manufacturer's instructions.
- .3 Apply wood plugs as detailed to fill attachment assembly and drill holes in open-grain woods to produce smooth, glasslike finish.
- .4 Apply all finishing agents in accordance with manufacturer's instructions.

END OF SECTION

PART 1) GENERAL

1.1 RELATED WORK

- .1 Section 06100 - Rough Carpentry

1.2 REFERENCES

- .1 CAN3-O86-M84, Engineering Design in Wood (Working Stress Design).
- .2 CAN/CSA-O86.1-M89, Engineering Design in Wood (Limit States Design).
- .3 CAN/CSA-O141-M91, Softwood Lumber.
- .4 CSAS307-M1980, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
- .5 CSAS347-M1980, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
- .6 NLGA-1980, Standard Grading Rules for Canadian Lumber.

1.3 DESIGN CRITERIA

- .1 Design trusses, bracing bridging in accordance with CAN3-O86 for loads indicated for building locality as ascertained by NBC Supplement No.1, Climatic Information for Building Design in Canada and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.
- .2 Limit live load deflection to 1/360th of span where plaster gypsum board ceilings are hung directly from trusses.
- .3 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

1.4 SOURCE QUALITY CONTROL

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.
- .2 Certify preservative and fire retardant treated wood in accordance with CAN/CSA-O80 Series.

1.5 QUALIFICATION OF MANUFACTURERS

- .1 Fabricator for welded steel connections to be certified in accordance with CSAW47.1.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.
- .2 Each shop drawing submission shall bear signature and stamp of professional engineer registered or licensed in province of Ontario, Canada.
- .3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details.
- .4 Provide certification that trusses meet requirements of CSAS307 and CSAS347.

- .5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
- .6 Show lifting points for storage, handling and erection.
- .7 Show location of lateral bracing for compression members.

1.7 DELIVERY AND STORAGE

- .1 Deliver, handle, store and protect materials in accordance with Section 01610 - Basic Product Requirements.
- .2 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

2 PRODUCTS

2.1 Materials

- .1 Lumber: to following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
- .2 Fastenings: to CAN/CSA-O86.1.

2.2 FABRICATION

- .1 Fabricate wood trusses in accordance with reviewed approved shop drawings.
- .2 Provide for design camber and roof slopes when positioning truss members.
- .3 Cut truss members to accurate length, angle, and size to assure tight joints for finished trusses.
- .4 Assemble truss members to design configuration.
- .5 Connect members using metal connector.

3 EXECUTION

3.1 Erection

- .1 Erect wood trusses as indicated in accordance with reviewed approved erection drawings.
- .2 Indicated lifting points to be used to hoist trusses into position.
- .3 Restrict construction loads to design loads to prevent overstressing of truss..
- .4 Exercise care to prevent out-of-plane bending of trusses.
- .5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with approved reviewed shop drawings, prior to application of loads to trusses.
- .7 Do not cut or remove any truss material without approval of Consultant.

- .8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

END OF SECTION

PART 1) GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 36/A 36M-94, Specification for Carbon Structural Steel.
 - .2 ASTM A 47M-90, Specification for Ferritic Malleable Iron Castings.
 - .3 ASTM A 307-94, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .4 ASTM A 653/A 653M-95, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
- .3 Canadian Standards Association
 - .1 CSA B111-1974, (R2003) Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G40.21-M92, Structural Quality Steels.
 - .3 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CAN/CSA-O80 Series-M89, Wood Preservation.
 - .5 CAN/CSA-O86.1-94, ing Design in Wood (Limit States Design).
 - .6 CSA O112 Series-M1977, CSA Standards for Wood Adhesives.
 - .7 CAN/CSA-O122-M89, Structural Glued-Laminated Timber.
 - .8 CAN/CSA-O177-M89, Qualification Code for Manufacturer's of Structural Glued-Laminated Timber.
 - .9 CAN/CSA-S16.1-94, Limit States Design of Steel Structures.
 - .10 CSA W47.1-92, Certification of Companies for Fusion Welding of Steel Structures.

1.2 SHOP DRAWINGS

- .1 Submit shop and erection drawings in accordance with Section 01330 - Shop Drawings, Product Data, Samples and Mock-ups.
- .2 Submit erection drawings in accordance with CAN/CSA-S16.1.
- .3 Shop drawings for members to indicate final structural sizes, stress grade, service grade and appearance grades, shop applied finishes, camber, cuts, ledgers, holes, steel, and connection details.
- .4 Design connections and sizes of all members shall be in conformance to meet the intent of the design drawings and all local environmental conditions.
- .5 Each erection and shop drawing submission shall bear signature and stamp of qualified professional registered or licensed in province of Ontario, Canada, for items designed by fabricator or manufacturer.

1.3 QUALIFICATIONS

- .1 Manufacture structural glued-laminated members in plant certified by CSA as meeting requirements of CAN/CSA-O177, class X.

- .2 Submit certificate in accordance with CAN/CSA-O177, Appendix B at completion of fabrication.
- .3 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.
- .4 Place authorization labels on glued-laminated members indicating manufactured in CSA certified plant.
- .5 Certification of material protective sealer.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials of this section in accordance with Section 01 60 10 - Basic Product Requirements.
- .2 Apply protective sealer to glued-laminated units before shipping unless specified otherwise.
- .3 Wrap quality commercial grade members prior to leaving plant with a moisture resistant wrapping.
- .4 Use padded, non-marring slings for handling glued-laminated members.
- .5 Protect corners with wood blocking.
- .6 Slit underside of membrane covering during storage at site. Do not deface member.
- .7 Store glued-laminated units and protect from weather, block off ground and separate with stripping, so air may circulate around all faces of members.
- .8 Cover glued-laminated units with opaque moisture resistant membrane if stored outside.
- .9 Make adequate provision for delivery and handling stresses.

2 PRODUCTS

2.1 MATERIALS

- .1 Laminating stock: Sustainably harvested Lodgepole Pine and/or Spruce to CAN/CSA-O122.
- .2 Adhesive: to CSA O112 Series, to grade of service required in accordance with CAN/CSA-O122.
- .3 Sealer for glued-laminated members: penetrating type, clear, non-yellowing liquid.
- .4 Fastenings:
 - .1 Split ring connections: hot rolled carbon steel, SAE 1010, meeting requirements of SAE handbook.
 - .2 Shear plate connections.

- .1 Pressed steel type: hot rolled carbon steel, SAE 1010, meeting requirements of SAE handbook.
 - .2 Malleable iron type: to ASTM A 47M, grade 350.
 - .3 Bolts: to ASTM A 307.
 - .4 Side plates: to CAN/CSA-G40.21 or ASTM A 36.
 - .5 Drift pins: to ASTM A 307.
 - .6 Glued-laminated rivets: hot dip galvanized to CAN/CSA-G40.21 or ASTM A 36.
 - .7 Nails and spikes: to CSA B111.
 - .8 Truss plates: light gauge galvanized sheet steel to ASTM A 653, grade A, yield point 255 MPa.
- .5 Shop coat primer for steel connections: to CAN/CGSB-1.40.
- .6 Preservative: borax salt.

2.2 FABRICATION

- .1 Fabricate members to following classifications:
 - .1 Stress grade: to 24f-E bending grade 18t-E tension grade.
 - .2 Service grade: 'Exterior'.
 - .3 Appearance grade: 'Quality'.
- .2 Mark laminated members for identification during erection. Marks not to be visible in final assembly.
- .3 Do not apply sealer to areas which are to receive stained finish or preservative treatment.
- .4 Unless specifically detailed, design connections to CAN/CSA-O86.1, and CAN/CSA-S16.1, to resist shears, moments and forces indicated. Fabricate in accordance with CAN/CSA-S16.1.
- .5 Galvanize all connections after fabrication.

3 EXECUTION

3.1 PRESERVATIVE TREATMENT

- .1 After fabrication, pressure treat all indicated members with preservative and fire-retardant in accordance with CAN/CSA-O80 Series.

3.2 ERECTION

- .1 Ensure protective sealer is not damaged before erection. If damaged, touch up on site before erection.
- .2 Erect glued-laminated members as indicated in accordance with reviewed erection drawings.
- .3 Brace and anchor members until permanently secured by structure.
- .4 Make adequate provisions for erection stresses.

-
- .5 Splice and join only at locations as indicated on approved reviewed erection drawings.
 - .6 Do not field cut or alter members without Consultant's approval. If approved, preservative treat all cut ends.
 - .7 Collect waste wood pieces from cutting for reuse where appropriate.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 01 45 00 Quality Control
- .3 Section 01 60 00 Basic Product Requirements
- .4 Section 05 50 00 Metal Fabrication
- .5 Section 06 10 00 Rough Carpentry
- .6 Section 07 90 00 Joint Sealers.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.2 1994, Density 640-800kg/m³, Medium Density Fiberboard for Interior Use.
 - .2 ANSI A208.1-1993, Density 640-800kg/m³, Grade M2, Particleboard for Interior Use.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork 1998.
- .3 Canadian Standards Association (CSA)
 - .1 CAN3 A172 M79 , High Pressure Paper Base, Decorative Laminates.
 - .2 CSA B111 1974 , Wire Nails, Spikes and Staples.
 - .3 CSA O115 M82 , Hardwood and Decorative Plywood.
 - .4 CSA O121 M1978 , Douglas Fir Plywood.
 - .5 CAN/CSA O141 91 , Softwood Lumber.
 - .6 CSA O151 M78 , Canadian Softwood Plywood.
 - .7 CSA O153 M80 , Poplar Plywood.
 - .8 CAN3 O188.1 M78 , Interior Mat Formed Wood Particleboard.
 - .9 CAN/CGSB 11.3 M87 , Hardboard.
- .4 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress January 1998.
- .5 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 1991.

1.3 QUALITY CONTROL

- .1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.
- .2 Work that does not meet standards, as specified, shall be replaced or made good to the satisfaction of AWMAC and the consultant. Additional work required replacing, rendering and/or refinish work not meeting the standards of these specifications shall be done at no additional cost to the owner including any additional inspections to satisfy AWMAC approvals.
- .3 All work shall comply with AWMAC Custom Grade Quality. AWMAC standard specified shall be considered a minimum standard. If greater quality of any components is specified in these documents that that of AWMAC specified quality, the architectural woodworker shall perform work to the greater of the AWMAC standard or specified standard.

1.4 SHOP DRAWINGS

-
- .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Indicate details of construction materials, profiles, jointing, fastening finishes and other related details.
 - .3 Indicate locations of all service outlets in casework, and all connections, attachments, anchorage and location of exposed fastenings. Indicate as-built site measurements.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm.
- .3 Submit duplicate colour samples all cabinet and counter finish materials for consultant colour selection.
- .4 Submit duplicate samples of laminated plastic joints, edging, cutouts nosing's, and postformed profiles.
- .5 Submit duplicate samples of all finished wood of stain or paint colour as selected by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

1.7 WARRANTY

- .1 Provide to the owner a two (2) year warrantee. The warantee shall cover replacement, reworking and/or refinishing to make good defects in architectural woodwork due to faulty workmanship, which appear during a two (2) year period following the date of substantial performance.

2 PRODUCTS

2.1 MATERIALS

- .1 Softwood lumber: unless specified otherwise, S4S, in accordance with following standards:
 - .1 CAN/CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC custom grade, moisture content as specified.
- .4 Plywood: to comply with or exceed requirements of CSA 0115-1987 Type II.
- .5 Stainless Steel: 16 guage, type 304 with #4 finish on 19mm marine grade plywood.

2.6 COUNTER FABRICATION

- .1 Stainless Steel: 19mm veneer core.

3 EXECUTION

3.1 INSTALLATION

-
- .1 Do architectural woodwork to Custom Grade Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
 - .2 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.
 - .3 Use draw bolts in countertop joints.
 - .4 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
 - .5 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
 - .6 Apply water resistant building paper or bituminous coating over wood framing members in contact with masonry or cementitious construction.

3.2 CLEANING

- .1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.
- .2 See drawings for existing millwork to be salvaged from demolition and reinstalled in new location. Store and protect millwork as required. Damaged millwork shall be replaced with new to match at consultant's discretion.

3.3 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 07 62 00 – Sheet Metal Flashing & Trim
- .3 Section 07 30 00 - Ice & Water Roofing Underlayment

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.4- M89, Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
 - .2 CAN/CGSB-37.5- M89, Cutback Asphalt Plastic Cement.
 - .3 CAN/CGSB-51.32- M77, Sheathing, Membrane, Breather Type.
 - .4 CAN/CGSB-51.33- M89 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .2 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Specification.
- .3 Canadian Standards Association (CSA)
 - .1 CSA A123.1- M1979 (R1992), Asphalt Shingles Surfaced with Mineral Granules.
 - .2 CSA A123.2- M1979 (R1992), Asphalt Coated Roofing Sheets.
 - .3 CSA A123.3- M1979 , Asphalt or Tar Saturated Roofing.
 - .4 CAN3-A123.51- M85 (R1992), Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
 - .5 CAN3-A123.52- M85 (R1992), Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
 - .6 CSA B111- 1974, Wire Nails, Spikes and Staples.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 44 - Hazardous Materials. WHMIS acceptable to Labour Canada, and Health and Welfare Canada for asphalt shingles.
- .3 Submit product data sheets for asphalt shingles. Include:
 - .1 Product characteristics
 - .2 Performance criteria
 - .3 Installation instructions
 - .4 Limitations.
 - .5 Colour and finish

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures for Consultants review and colour selection.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Basic Product Requirements.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Remove only in quantities required for same day use.

1.6 EXTRA MATERIALS

- .1 All unused shingles remain property of owner.

1.7 WARRANTY

- .1 Submit warranty information in accordance with section 01 33 00 submittals
- .2 Provide both product and methods of installation to provide manufacturers standard lifetime warranty and for wind coverage to a minimum of 210km/hr.

2 PRODUCTS

2.1 MATERIALS

- .1 Asphalt shingles: to CSA A123.1.
 - .1 Type: self-seal interlocking individual pattern.
 - .2 Mass: minimum 135 kg/3m² for 300 lbs/100ft².
 - .3 Colours: as selected by Consultant.
 - .4 Acceptable material:
 - .1 Building Products of Canada Corp.: Mystique, Lifetime warranty
 - .2 IKO: Cambridge, Lifetime warranty
 - .3 GAF: Timberline, Lifetime warranty
- .2 Cement:
 - .1 Plastic cement: to CAN/CGSB-37.5.
 - .2 Lap cement: to CAN/CGSB-37.4.
- .3 Drip edge: per Section 07260 Sheet Metal Flashings and Trim to profile indicated.
- .4 Nails: Galvanized roofing nails, 11 or 12 gauge, with at least 10mm diameter heads, long enough to penetrate through plywood 13mm.
- .5 Underlayment: Breathable polypropylene roof deck protection.
 - .1 Acceptable material
 - .1 "Building Products of Canada Corp. : BP ProDesk
 - .2 IKO Stormtite
 - .3 "GAF" Deck Armor. Or approved alternative product
- .6 Ice and Water Roofing Underlayment: Cold applied , self-adhering membrane composed of a high strength polyethylene film coated on one side with a layer of rubberized asphalt adhesive.
 - .1 Acceptable Materials: Grace Ice and Water Shield
 - .2 IKO Goldshield Ice and Water Protector
 - .3 Resisto Lastobond
- .7 Accessories:
 - .1 Vent Pipe Flashing: Permanent, new roofing vent pipe flashing with integral shingle over roof flange. Perma-Boot or approved equal. Size to suit application.
 - .2 Ridge Attic Exhaust Vent: Continuous, shingle over, rigid, crush resistant, with snow guard filter to pass 110mph wind driven test and provide minimum 18 sq inches / linear foot of free ventilating area. 'GAF' Snow Country Advanced or approved equal.
 - .3 Prefinished Valley Flashing: Preformed 'W' 610mm x 2360mm, 0.015 thickness.
 - .4 Metal eaves starter- 114mm x 300mm.

3 EXECUTION

3.1 PREPARATION

- .1 Inspect the structural wood sheathing for the following:
 - .1 Roof deck is smooth, firm, dry and securely nailed.
 - .2 Remove all loose or protruding nails.
 - .3 Sweep surface of the deck clean.
- .2 Report any unsatisfactory conditions to the consultant prior to installation of the new work.

3.2 APPLICATION

- .1 Shingles:
 - .1 Do asphalt shingle work in accordance with CAN3-A123.51, CAN3-A123.52, NBC CRCA Specification except where specified otherwise.
- .2 Drip Edge:
 - .1 Install drip edge along eaves and rake edge. Provide 50 mm minimum coverage onto deck. Nail drip edge at 400 mm maximum oc. Provide spacing of 5 to 10 mm from fascia.
- .3 Underlayment:
 - .1 Install as per manufacturer's instructions parallel to eaves and wrinkle free. Manufacturer approved fasteners shall come with plastic caps.
- .4 Install bottom step flashing (soaker base flashing) interleaved between shingles at vertical junctions.
- .5 Flashings:
 - .1 Protect the intersection of shingle roofs and walls with sheet metal flashing that extends 150 mm minimum each way from intersection.
 - .2 Step flashing on slopes 75 mm minimum lead lap in both lower and counter flashing.
 - .3 Extend counter flashings 25 mm minimum into masonry.
 - .4 Protect all areas where roofing at vent pipes and other projections through the roof. Extend flashings 150 mm minimum onto roof surface.
- .6 Hips and ridges:
 - .1 Cap all ridges and hips as per manufacturers instructions.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 06 1 000 - Rough Carpentry
- .2 Section 07 90 00 - Joint Sealers

1.2 REFERENCES

- .1 ASTM D1006-93 - Practice for Conducting Exterior Expose Tests of Paints on Wood.
- .2 ASTM D1210-79 - Test Method for Fineness of Dispersion of Pigment-Vehicle Systems.
- .3 ASTM D3359-95 - Test Method for Measuring Adhesion by Tape Test.
- .4 ASTM D3363-92a - Test Method for Film Hardness by Pencil Test.
- .5 ASTM D3575-93 - Test Methods for Flexible Cellular Materials Made from Olefin Polymers.

1.3 PRODUCT DATA

- .1 Submit samples to requirements of Section 01 33 00.
- .2 Product Data: Provide data indicating materials, component profiles, fastening methods, jointing details, sizes, surface texture, finish and accessories.
- .3 Samples: Submit sample 150MM long FOR Architect illustrating surface texture, finish, and sheen.

1.4 QUALITY CONTROL

- .1 Grade materials in accordance with the following:
- .2 Lumber Grading: Certified by NLGA Standard Grading Rules for Canadian Lumber - No 1 select or better grade
- .3 CSA o141-9 – Softwood lumber

2.1 DELIVERY, STORAGE AND PROTECTION

- .1 Transport, handle, store, and protect products to Section 01330.
- .2 Store in ventilated areas

2.2 WARRANTY

- .1 Fifteen year product protection plan. If the coating fails, as defined in the plan during the first five (5) years after installation the manufacturer will supply labor and material to repaint the siding. If the coating fails during the next ten (10) years the manufacturer will supply new paint but no labour. See the manufacturer's printed product protection plan for complete details

PART 2 PRODUCTS

2.3 MANUFACTURERS

- .1 Approved Manufacturers:
 - .1 Cape Cod Finished Wood Siding, Maibec Sidings or approved alternate

2.4 SIDING MATERIALS

- .1 Siding: Spruce, Pine, Fir (SPF) No. 1 Select or Better grade, band sawn textured face,

- .2 Profile: Traditional V-Joint 137mm width, rough finish. Allow 2 colours 1 colour for wall application and 1 colour for exterior soffit / interior ceiling application.

2.3 ACCESSORIES

- .1 Rink Shank Nails: Double hot dipped zinc coated galvanized painted to siding colour, to securely and rigidly retain the work permanently in position, corrosion and rust resistant, pre-finished coating to match siding finish; Size: 63mm
- .2 Sealant: Thermoplastic type, clear. Equal to Tremco 830 manufactured.

PART 3 EXECUTION

3.1 FINISH

- .1 Factory applied under controlled environment conditions by a modified vacuum coater to all surfaces Stained and varnished to match colour of structural wood decking.
- .2 Touch-up Paints to match as above for all on site touch-up work.

3.2 INSTALLATION

- .1 Install siding and accessories to manufacturer's written instructions and according to all local and national building codes
- .2 End joint Board to Board: Join boards using a 45° angle bevel cut, placed evenly over solid backing.
- .3 Siding to be factory-coated on all six sides in a controlled environment for maximum stain absorption and retention. Apply minimum 2 coats or to achieve specified warranty.
- .4 Mitre cut all corners

3.3 INCIDENTAL SITE FINISHING

- .1 Carefully set exposed nails flush with siding coating.
- .2 Touch-up blemished siding materials to match siding color
- .3 Apply touch-up stain to all cut or planed surfaces and to all board wood, even if it is not visible once the siding is installed. Touch up all boards before they are installed.

END OF SECTION

PART 1) GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 - Basic Product Requirements
- .2 Section 04 05 23 - Masonry Accessories.
- .3 Section 06 10 00 - Rough Carpentry.
- .4 Section 07 90 00 – Joint Sealers

1.2 REFERENCES

- .1 Aluminum Sheet Metal Work in Building Construction-1980
- .2 ASTM A 653/A 653 M-95, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 Canadian Roofing Contractors Association (CRCA). Roofing Specifications

1.3 SAMPLES

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

1.4 WARRANTY

- 1 Contractor hereby warrants that work performed under this Section shall remain free against leakage, joint spalling, loss of finish and similar defects in accordance with General Conditions, but for a period of five (5) years.

1.5 INSPECTION AND TESTING

- 1 Inspection and testing of this Work is included in inspection and testing of roofing and roof insulation.

2 PRODUCTS

2.1 SHEET METAL MATERIALS

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A 792/A 792M, commercial quality, with AZ150 Galvalume coating, regular spangle, 0.72 mm base metal thickness, prefinished.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied silicone modified polyester.
 - .1 Colour selected by Consultant from manufacturer's standard range.
 - .2 Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.
 - .3 Coating thickness: not less than 25 micrometres.
 - .4 Resistance to accelerated weathering for chalk rating of 8 , colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:
 - .1 Outdoor exposure period 1000 hours.
 - .2 Humidity resistance exposure period 500 1000 hours.
 - .5 Acceptable Product: Baycoat 8000

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.

- .2 Plastic cement: to CAN/CGSB 37.5-M89.
- .3 Sealants: to Section 07 90 00.
- .4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .7 Solder: to ASTM B 32, alloy composition.
- .8 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .9 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.
- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.7mm thick prefinished steel.

2.6 PANS

- .1 Form pans to receive roofing mastic from galvanized steel sheet metal with minimum 75 mm upstand above finished roof and 100 mm continuous flanges with no open corners. Make pans minimum 50 mm wider than member passing through roof membrane.

2.7 REGLETS AND CAP FLASHINGS

- .1 Form recessed surface mounted reglets metal cap flashing sheet metal to be built-in concrete masonry work for base flashings as detailed in accordance with CRCA FL series details. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

2.9 GASKETING

- .1 Provide neoprene gasketing at all connections of dissimilar metals as required to guard against electrolytic action.

2.10 THRU WALL FLASHING

- .1 Through wall flashing equal to: Dur-o-wall DA 1544 Dur-o-wall Thru Wall Flashing.

3 EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details, and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints forming tight fit hook as detailed.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing into reglets under cap flashing to form weather tight junction.
- .8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .9 Caulk flashing at reglet cap flashing with sealant.
- .10 Install pans, where shown around items projecting through roof membrane.
- .1 Install scuppers as indicated.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

- .1 The work included under this section shall conform to the industry standard and be accepted by the local construction and trade associations.
- .2 Shop Drawings:
 - .1 Provide shop drawings per Section 0 133 00. Indicate gutter and downspout profile and anchorage.
 - .2 Provide downspout locations and gutter slope layout.

Part 2 Products

2.1 MATERIALS

- .1 Pre-coated Galvanized Steel: ASTM A525, Z275 zinc coating; 0.6 mm core steel, shop pre-coated with 1000 series coating, colour as selected by Architect. Allow 1 colour.
- .2 Galvanized Steel: ASTM A525, Z275 zinc coating; 0.6 mm core steel.

2.2 COMPONENTS

- .1 Gutters: Square profile 150 mm wide x 150 mm deep
- .2 Upper Downspouts: Rectangular closed face profile; 100 mm deep x 150 mm wide.
- .3 Splashpads: Precast concrete, match existing, minimum 300mm x 600mm with 75 mm thickness at revised edges.

2.3 ACCESSORIES

- .1 Anchorage Devices: Type recommended by fabricator.
- .2 Gutter Supports: Brackets or Straps, as is appropriate, maximum spacing apart 1000 m.
- .3 Downspout supports: Straps.

2.4 FABRICATION

- .1 Form gutters and downspouts to profiles and sizes indicated.
- .2 Field measure site conditions prior to fabricating work.
- .3 Fabricate with required connection pieces.
- .4 Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
- .5 Hem exposed edges of metal.
- .6 Seal metal joints.
- .7 Fabricate gutter and downspout accessories; seal watertight.

Part 3 Execution

3.1 INSPECTION

- .1 Verify that surfaces are ready to receive work.
- .2 Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- .1 Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- .2 Apply bituminous protective backing on surfaces in contact with dissimilar materials.
- .3 Slope gutters 5mm/m minimum.
- .4 Seal metal joints watertight for full metal surface contact.
- .5 Set splash pads under downspouts.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 - Basic Product Requirements

1.2 REFERENCES

- .1 ASTM C 1193 Standard guide for use of joint sealants.
- .2 CGSB 19-GP-5M-76, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .3 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .4 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent Curing.
- .5 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .6 CAN/CGSB-19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing.
- .7 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.
- .8 CAN/CGSB-19.22-M89, Mildew Resistant, Sealing Compound for Tubs and Tiles.
- .9 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide consultant with samples of all coloured sealers for colour selection

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Basic Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.5 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Ventilate area of work by use of approved portable supply and exhaust fans.

1.6 QUALITY ASSURANCE

- .1 Installation of sealants shall be preformed by a firm with minimum of five (5) years experience.

1.7 WARRANTY

- .1 Submit written warranty against leaks, cohesive failure, staining of adjacent materials, in accordance with GC 12.3 but for five (5) years.

The warranty shall be issued by the Contractor and the Sealant Manufacturer.

2 PRODUCTS

2.1 SEALANT MATERIALS

- .1 Sealants and caulking compounds must:
 - .1 meet or exceed all applicable governmental and industrial safety and performance standards; and
 - .2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the fisheries Act and the Canadian Environmental Protection Act (CEPA).
 - .3 Use products of a single manufacturer for each different product and required recommended primers.
- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.
- .3 Sealant and caulking compounds must not contain a total of volatile organic compounds (VOCs) in excess of 5% by weight as calculated from records of the amounts of constituents used to make the product;
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which offgas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 Sealants acceptable for use on this project except CAN/CGSB-19.1 and CAN/CGSB-19.18 must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Polyurethane One Part.
 - .1 Self-Levelling and Non Sag to CAN/CGSB-19.13, Type 1 and 2,
 - .2 Acceptable material: Tremco: Dymonic
Sonneborn: NP1, SL1
Sikaflex 1A
Pourethane NS
- .2 Polyurethane Two Part.
 - .1 Self-Levelling and Non Sag to CAN/CGSB-19.24, Type 1 and 2
 - .2 Acceptable material: Tremco: Dymeric
Sonneborn: NP2
Sikaflex: 2C or 2CSL.
- .3 Acrylic Latex One Part.
 - .1 To CAN/CGSB-19.17.
 - .2 Acceptable material: Tremco: Tremflex 834
General Electric (G.E. Supply): Acrylasil AL1300 (RC520)

Sonneborn: Sonolac.

- .4 Silicone Sanitary Sealant
 - .1 To CAN/CGSB-19.22 one part mildew resistant paintable..
 - .2 Acceptable material: Tremco - Tremsil 200
General Electric (G.E. Supply): 1700
Dow Corning: 786.
- .5 Acoustical Sealant - Synthetic Rubber
 - .1 To CGSB 19.21
 - .2 Acceptable material: Tremco - Acoustical Sealant.

2.3 PREFORMED COMPRESSIBLE AND NON-COMPRESSIBLE BACK UP MATERIALS

- .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded open closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
- .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
- .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
- .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

3 EXECUTION

3.1 PROTECTION

- .1 Protect installed work of other trades from staining or contamination.

3.2 PREPARATION OF JOINT SURFACES

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

3.7 SEALANT SCHEDULE

- .1 Interior Sealants - Non Elastomeric (acrylic latex)
 - .1 Perimeter of built in architectural wood work
 - .2 Junction: of casework gables and flooring.
 - .3 Perimeter of pressed steel frames and adjacent finishes, including bottom at floor.
 - .4 Interior perimeter of exterior openings.
- .2 Interior Sealants Elastomeric: Polyurethane One Part
 - .1 Interior side of expansion and control joints of concrete, masonry and precast concrete walls.
 - .2 Interior control and expansion joints in floor and deck surfaces (self levelling) sealant.
 - .3 Joints at underside of precast beams or slabs.
 - .4 Interior joints of precast concrete walls.
 - .5 Joints or tops of non load bearing masonry walls at underside of poured concrete.
 - .6 Exposed interior control joints in drywall.
 - .7 Interior perimeter of exterior openings
- .3 Interior Sealants - Silicone Sanitary
 - .1 Perimeter of bath fixtures (sinks, tubs, showers, urinals, water closets, basins, showers, vanities, stools)
 - .2 Junction of ceramic wall tile and finished flooring
- .4 Interior Sealants - Acoustical
 - .1 as indicated in section 09250.
- .5 Exterior Sealants – Elastomeric: Polyurethane Two Part
 - .1 Perimeter of exterior openings where frames connect exterior facade of building (ie.

-
- .2 brick, block, precast, masonry)
 - .2 Expansion and control joints in exterior surfaces of poured in place concrete, precast concrete, unit masonry, and architectural wall panels.
 - .3 Coping joints and coping to facade joints.
 - .4 Cornice and wash or horizontal surface joints
 - .5 Exterior control expansion and joints in concrete decks and horizontal traffic surfaces (use self levelling sealants).
 - .6 Self Levelling Sealants
 - .1 Sealant Control joints in concrete decks.
 - .2 Exterior joints in horizontal traffic surfaces
 - .3 Exterior control and expansion joints in decks.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 - Basic Product Requirements
- .2 Section 07 90 00 - Joint Sealers
- .3 Section 08 71 00 - Door Hardware
- .4 Section 08 71 13 – Power Door Operators
- .5 Division 26: Wiring for electronic hardware.

1.2 REFERENCES

- .1 ASTM A 653M-95, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA A101-M1983, Thermal Insulation, Mineral Fibre, for Buildings.
- .3 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .4 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).
- .5 CSDFMA, Specifications for Commercial Steel Doors and Frames, 1990.
- .6 CSDFMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .7 CAN4-S104M- M80(R1985), Fire Tests of Door Assemblies.
- .8 CAN4-S105M-M85, Fire Door Frames.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 3°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.
- .6 Indicate all special conditions.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.

- .1 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104.

1.6 WARRANTY

- .1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship, for one (1) year respectively.

2 PRODUCTS

2.1 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDFMA Table 1 - Thickness for Component Parts. (Paintable Galvanneal)
- .2 Reinforcement channel: to CAN/CSA-G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.

2.2 DOOR CORE MATERIALS

- .1 Honeycomb construction:
 - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness.
- .2 Stiffened: face sheets laminated welded, honeycomb uninsulated insulated core.
 - .1 Fibreglass: to CSA A101, semi-rigid Type 1A3 density 24 kg/m³.
 - .2 Expanded polystyrene: CAN/CGSB-51.20, density 16 to 32 kg/m³ fire retardant.
 - .3 Polyurethane: to CGSB 51-GP-21M rigid, modified poly/isocyanurate, closed cell board. Density 32 kg/m³.
- .3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250EC at 30 60minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

2.3 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMERS

- .1 Touch-up prime CAN/CGSB-1.181.

2.5 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior and interior top caps: rigid polyvinyl chloride extrusion conforming to CGSB 41-GP-19Ma.

- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Door bottom seal.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal rivetted.
- .7 Sealant: to Section 07900.
- .8 Glazing: to Section 08800.
- .9 Make provisions for glazing as indicated and provide necessary glazing stops.
 - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws dry glazing of snap-on type.
 - .2 Design exterior glazing stops to be tamper proof.

2.6 FRAMES FABRICATION GENERAL

- .1 Fabricate doors and frames in accordance with CSDFMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.6mm thermally broken type construction.
- .4 Interior frames: 1.6 mm welded construction.
- .5 Blank, reinforce, drill and tap frames for mortised, template hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

2.7 FRAME ANCHORAGE

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

2.8 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.

- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .7 Securely attach lead to inside of frame profile from return to jamb soffit inclusive on door side of frame only at lead lined door assembly

2.9 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: honeycomb construction. Interior doors: honeycomb construction.
- .3 Fabricate doors with longitudinal edges locked seamed, adhesive assisted welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Blank, reinforce, drill doors and tap for mortised, template hardware and electronic hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104, ASTM E 152 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .9 Manufacturer's nameplates on doors are not permitted.

2.10 DOORS: HONEYCOMB CORE CONSTRUCTION

- .1 Form each face sheet for exterior doors from 1.6 mm sheet steel with honeycomb polystyrene polyurethane core laminated under pressure to face sheets.
- .2 Form each face sheet for interior doors from 1.6 mm sheet steel with honeycomb - temperature rise rated core laminated under pressure to face sheets.

2.11 HOLLOW STEEL CONSTRUCTION

- .1 Form each face sheet for exterior doors from 1.6 mm sheet steel.
- .2 Form each face sheet for interior doors from 1.6 sheet steel.
- .3 Reinforce doors with vertical stiffeners, securely welded to each face sheet at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with fibreglass core.
- .5 Fill voids between stiffeners of interior doors with fibreglass core.

3 EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDFMA Installation Guide.

3.2 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air vapour barrier per section 07 26 00.

3.3 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 0 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
 - .1 Hinge side: 1.0 mm.
 - .2 Latch side and head: 1.5 mm.
 - .3 Finished floor, top of carpet noncombustible sill and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.

3.4 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 00 - Glazing.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

1.2 RELATED SECTIONS

- .1 Section 07311 - Asphalt Shingles: Flashing of skylight base.

1.3 REFERENCE STANDARDS

- .1 ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.
- .3 ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006.
- .4 ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007.
- .5 ASTM A792/A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
- .6 ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- .7 ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006.
- .8 ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.
- .9 ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.
- .10 ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- .11 ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane
- .12 ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position; 2006.
- .13 ASTM D-1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).
- .14 UL 181 - Factory Made Air Ducts and Air Connectors
- .15 ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

1.4 PERFORMANCE REQUIREMENTS

- .1 Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
 - .1 System Insulation Value: No more than 0.17 U-factor (no less than R-5.88) as tested by NFRC certified laboratory.
 - .2 Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.

- .3 Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
- .4 Uniform Load Test:
 - .1 No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
 - .2 All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
- .5 Hurricane Resistance:
 - .1 Meets Florida Building Code TAS, 201, TAS, 202 and TAS 203 for Impact and non impact components.
 - .2 Meets ASTM E 1886 and ASTM E1996 for missile and cyclic pressure differential testing.
- .6 Fire Testing:
 - .1 When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
 - .2 Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
 - .3 Smoke Density - Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
 - .4 Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
 - .5 Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

1.5 SUBMITTALS

- .1 Submit under provisions of Section 01 30 00.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including: Preparation instructions and recommendations.
Storage and handling requirements and recommendations.
Installation methods.
- .3 Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.
- .4 Verification Samples: As requested by Architect.

Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 20 years.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in manufacturer's unopened packaging until ready for installation.

- .2 Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- .1 Daylighting Device: Manufacturer's standard warranty for 10 years.
- .2 Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Acceptable Manufacturer: Solatube International, Inc. distributed by Bravura Daylighting Specialists. 800-803-1235 info@bravuradaylighting.com
- .2 Requests for substitutions will be considered provided a lighting layout with photometric data is supplied to demonstrate light levels will meet original design intent and documentation providing evidence of compliance of specified insulation value no later than ten business days prior to original tender close date.

2.2 TUBULAR DAYLIGHTING DEVICES

- .1 Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
- .2 SolaMaster Series: Solatube Model 750 DS-C Penetrating Ceiling, 350mm Daylighting System:
 - .1 Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
 - .1 Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
 - .2 Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
 - .3 Inner Dome Glazing: Type DAI, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.
 - .2 Roof Flashing Base:
 - .1 One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A 792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.15 mm) thick.
 - .1 Base Style: for sloped roof application.

- .3 Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
- .4 Dome Seal: Adhesive backed weatherstrip 0.63 inch (16 mm) tall by 0.28 inch (7 mm).
- .5 Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).
 - .1 General:
 - .1 Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
 - .2 Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - .2 Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit, Type AK:
 - .1 Reflective 45 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long
 - .3 Extension Tube:
 - .1 Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) or 48 inches (1220 mm) long.
- .6 Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
 - .1 Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.
 - .2 Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
 - .3 Supplemental Natural Effect Lens made of acrylic, classified as CC2, Class C, 0.060 inch (1.5 mm) thick, with open cell foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283.
- .7 Accessories:
 - .1 Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
 - .2 Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
 - .3 Thermal Insulation Panel: Type TIP, high-performance dual-glazed, thermally-broken tube insulation system consisting of two acrylic panels, spaced 1.0 inch (25.4mm) apart, classified CC2 Class C material, 0.110 inch (2.8 mm) thick, housed in a polyethylene terephthalate glycol-modified (PETG) or acrylonitrile butadiene styrene (ABS) band classified as CC2 material 0.060 inch (1.5 mm) thick by 1.75 inch (44.5 mm) high with Spectralight Infinity high reflectance specular finish interior surface, and assembled with stainless steel disk

spacers 0.0197 inch (0.5 mm) thick and aluminum rivets 0.13 inch (3.2 mm) fastened periodically around the perimeter.

2.3 ACCESSORIES

- .1 Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- .2 Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- .3 Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

3 EXECUTION

3.1 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared.
- .2 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- .1 Install in accordance with manufacturer's printed instructions.
- .2 After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

- .1 Supply only of finishing hardware for interior and exterior doors shall be supplied under the cash allowance per Section 01 21 00 associated with additional price. Note that all hardware as listed to be supplied within their specific specification sections will be required to be supplied within that section and not included in the cash allowance.

1.2 RELATED SECTIONS

- .1 01 61 00 Basic Product Requirements
- .2 04 22 00 Masonry
- .3 08 11 00 Steel Door & Frames
- .4 Division 16: Electrical wiring for magnetic locks, electric strikes, electric locks, electric releases and power supplies.

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED IN THIS SECTION

- .1 Power supplies, compressor/control boxes, junction boxes, magnetic locks, electric locks, electric strikes, door status switches and electric releases installed by 26.

1.4 REQUIREMENTS REGULATORY AGENCIES

- .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Provide permanently attached labels for all hardware required to be rated as part of a fire resistant door and frame assembly.

1.5 REFERENCES

- .1 Recommended locations for Architectural Hardware for Standard Steel Doors and Frames - Door and Hardware Institute
- .2 Recommended locations for Architectural Hardware for Flush Wood Doors – Door and Hardware Institute
- .3 NFPA 80-Standard for Fire Doors and Windows
- .4 Sequence Format for Hardware Schedule – Door and Hardware Institute
- .5 Key Systems and Nomenclature - Door and Hardware Institute
- .6 Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications – Door and Hardware Institute.
- .7 Ontario Building Code 2012 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by

Canadian Steel Door and Frame Manufactures' Association.

1.6 WARRANTY

- .1 Provide a written manufacturer's warranty for work of this Section for failure due to defective materials for ten (10) years, dated from substantial completion.
- .2 Provide a written Contractor's warranty for work of this Section for failure due to defective installation workmanship for one (1) year, dated from submittal substantial completion.

2 PRODUCTS

2.1 MATERIAL

- .1 Refer to the hardware list included in this section.
- .2 Installation cost associated with the hardware must be included in the tender bid.
- .3 All work associated with section 08 71 13 Power Door Operators shall be excluded from this section and shall be included in the base bid.

3 EXECUTION

3.1 EXAMINATION

- .1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.
- .3 Submit in writing a list of deficiencies determined as part of inspection required in 3.1.1 and 3.12 to supervising consultant prior to installation of finished hardware.

3.2 INSTALLATION

- .1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the hardware distributor.
- .2 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings.
- .3 Where mounting height is not otherwise specified, install hardware at mounting heights as indicated in 1.5.1, 1.5.2.
- .4 Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions.
- .5 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. **Handing is part of installation procedure.**

- .6 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. **Handing is part of installation procedure.**
- .7 Follow all manufactures installation instructions. Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.
- .8 Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops/holders. .10 Counter sink through bolt of door pull under push plate during installation. .11 Mount all closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule.

3.3 FIELD QUALITY CONTROL

- .1 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.
- .2 Before completion of the work but after the hardware has been installed, a certificate to the architect will be submitted stating that final inspection has been made and that hardware has been checked for installation and operation by a technician from the manufacturer and hardware consultant.

3.4 ADJUSTING AND CLEANING

- .1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.
- .2 All hardware to be left clean and free of disfigurements.
- .3 Instruct/demonstrate to Consultant and Owner's staff in the proper operation, adjustment, maintenance of hardware and finishes.
- .4 Check all locked doors against approved keying schedule.
- .5 Remove protective coatings prior to final inspection.
- .6 Prior to date of substantial completion, adjust hardware. Repair or replace defective hardware or installation.

3.5 PROTECTION

- .1 Protect hardware from damage during construction period by removing and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturers warranty.

3.6 HARDWARE GROUPS

- .1 Under separate cover, see schedules.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 – General Requirements.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental necessary to provide automatic power door operator systems including the following:
 - .1 Operator equipment
 - .2 Control system
 - .3 Activation devices

1.3 RELATED SECTIONS

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 05 50 00 Metal Fabrications
- .3 Section 08 11 00 - Steel Doors and Frames
- .4 Section 08 11 16 - Aluminum Doors & Frames
- .7 Division 26- Power Supply
- .8 Appendix- Door Schedule

1.4 REFERENCE STANDARDS

- .1 Aluminum Association (AA); DAF-45, Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA); Aluminum Curtain Wall Design Guide Manual.
- .3 ASTM B209-01; Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 CSA-G40.21; Structural Quality Steels
- .5 CAN/CSA G164-M92 (R1998); Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CAN3-S157-M83 (R2001); Strength Design in Aluminum.
- .7 CSA W59.2-M1991 (R1998); Welded Aluminum Construction.
- .8 CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1991; Power-Operated Pedestrian Doors.
- .9 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984; Power Assist and Low Energy Power-Operated Doors.
- .10 CAN/ULC-S533-2002; Egress Door Securing and Releasing Devices.

1.5 SYSTEM DESCRIPTION

- .1 Designed for low energy applications, surface mounted, automatic swing door operator consists of aluminum operator housing, A.C. electro-hydraulic motor, operator assembly, wiring harnesses, swing arm and electronic control.
- .2 Power Open: Automatic door operator powers the door open by forces transmitted hydraulically to the drive shaft and maintains a constant engagement throughout the opening cycle. Both opening and closing speed are field adjusted per current ANSI 156.19. Automatic door system is self-contained, requiring no remote pumps, exterior piping or compressors. The operator shall be equipped with a hydraulic bypass (relief valve), to divert fluid back to a reservoir to prevent motor overload if the door is restricted during opening cycle. Automatic door system functions as a manual door closer in the event of a power failure. Manual opening force is unaffected by opening speed adjustment. Manual force to open the door will not exceed 15 pounds, measured 25mm in from latch edge of door.
- .3 Spring Close: The automatic door operator is spring closed. The spring is non-handed and returns the door to full close.

1.6 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Indicate on shop drawings, layout, dimensions, elevations, detail sections of members, materials, finishes, hardware including mounting heights, anchors and reinforcement, provisions for expansion, and other pertinent information.
- .2 Maintenance Data
 - .1 Provide complete operation and maintenance data for inclusion in Operations and Maintenance Manual. Include spare parts list.
 - .2 Include manufacturer's parts lists, servicing frequencies, instructions for adjustment and operation applicable to each component.
 - .3 Include name, address and telephone number of nearest authorized service representative.

1.7 QUALITY ASSURANCE

- .1 Installation
 - .1 Installation of power door operators shall be performed by a company which is a certified installer of the manufacturer, for both installation and maintenance, and with minimum five (5) years documented servicing and installing experience. Submit documentation.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to site protected from damage.
- .2 Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- .3 Protect materials and finish from damage during handling and installation.

1.9 MAINTENANCE SERVICE

- .1 Manufacturer shall provide central-dispatch maintenance service available 24

hours per day, 365 days per year for maintenance service during the Contract Warranty period.

- .2 Toll free phone number shall be prominently displayed on header of each operator.

1.10 WARRANTIES

- .1 **Manufacturer's Warranty:** Units to be warranted against defect in material and workmanship for a period of one year from the Date of Substantial Completion. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.

2 PRODUCTS

2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

- .1 The following products and manufacturers are acceptable:
 - .1 Series 7000, by Horton Automatics
 - .2 Dorma ED400
 - .3 Series SW100, by Besam
 - .4 Stanley Magic Access

2.2 MATERIALS

- .1 **Aluminum:** Extrusions of minimum 3mm thick, Alcan 6061-T6 alloy for structural members, 6063-T5 for non-structural members.
- .2 **Screws, bolts and fasteners:** where used with aluminum shall be of 300 series stainless steel or 400 series stainless steel cadmium plated.
- .3 **Steel Reinforcement:** to CAN/CSA-G40.21, grade 300W.

2.3 AUTOMATIC SWING DOOR OPERATORS

- .1 **Operator:** Electro-hydraulic type, self-contained operator, powered by a 1/6 HP motor. Operator is non-handed. The operator housing provides a seal against dust, dirt and moisture.
- .2 **Electronic Control:** A self-contained, solid-state integrated circuit controls the operation and switching of the swing power operator. The electronic control provides low voltage power supply for all means of actuation. No external or auxiliary low voltage power source will be allowed. The controls include time delay (5 to 30 seconds) for normal cycle.
- .3 **Connecting Hardware:** Surface-mounted operator is connected to the door by means of a steel door arm. Door arm is secured to the top rail of the swing door using one piece threaded tubular inserts for aluminum doors, 1/4-20 binding head and post screws (sex bolts) for wood and hollow metal doors. Knurled door arm adaptor is broached for positive engagement with shaft.
- .4 **Activation**
 - .1 **Wall Switches:** Recessed push-button wall switches, with steel back-boxes and stainless steel push buttons engraved with standard barrier-

free logo. Provide buttons both sides of doors as noted on drawings.

- .5 Provide back plate with dark bronze anodized finish at operators that are exposed.

2.4 ELECTRICAL CHARACTERISTICS

- .1 Nominal current draw 222 watts (1.85 amps at 120V AC). Motor shall draw 672 watts maximum. Electric motor shall be equipped with a built-in thermal overload protection, and shall not exceed 10 amps current draw.
- .2 Provide two low-voltage 18 gauge stranded wires (per operator) from each automatic operator to remote activation devices.
- .3 All power door operators which are interfered with a card reader/electric strike must include a "Strike Interface"

2.5 FINISHES

- .1 Clear Anodized Finish to match Aluminum frames: Class II to AA-M12C22A3.

2.6 FABRICATION

- .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5mm for units with a diagonal measurement of 1800mm or less and plus or minus 3mm for units with a diagonal measurement over 1800mm.
- .2 Provide all internal reinforcing as required for the proper structural design and support of the framing system.
- .3 All joints shall be accurately machined, and assembled to provide neat joints.

3 EXECUTION

3.1 INSTALLATION

- .1 Install power door operators in accordance with reviewed shop drawings and manufacturer's printed instructions, including controls, wiring, and all activation devices.
- .2 Coordinate installation of components with related and adjacent work.
- .3 Set work plumb, square, level, free from warp, twist and superimposed loads.
- .4 Securely anchor work in required position.
- .5 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces at points of contact with cementitious materials.

3.2 SEALANT APPLICATION

- .1 Comply with requirements of Section 07 92 00 for sealants, fillers and gaskets to be installed during installation of doors and frames.
- .2 Conceal sealant within aluminum work except where exposed use is permitted by Consultant.
- .3 Set sill members in bed of sealant.

3.3 ADJUSTING

- .1 After repeated operation of completed installation equivalent to three days of use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum, smooth operating condition and safety and for weather tight closure. Lubricate hardware, operating equipment and other moving parts.
- .2 Adjust doors to provide tight fit at contact points with enclosure.

3.4 PROTECTION OF FINISHED WORK

- .1 Protect finished installation until time of final cleaning and inspection.
- .2 Leave all factory installed protective films in place until time of final cleaning.

3.5 FINAL CLEANING

- .1 Clean aluminum surfaces promptly after installation. Exercise care to avoid damage to coatings.
- .2 Remove protective material from prefinished aluminum surfaces.
- .3 Wash exposed surfaces with mild solution of detergent and warm water, using soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.
- .4 Remove excess sealant by moderate use of solvent, of type acceptable to sealant manufacturer.

3.6 DEMONSTRATION

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements to Owner.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

1. Furnish and install louvers, bird screens, blank-off panels, structural supports and attachment brackets as shown on the drawings, as specified, and as needed for a complete and proper installation.
2. The louvers to be furnished include the following:
 1. Fixed extruded storm resistant louvers.
3. Related sections include:
 1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.2 REFERENCES

1. Air Movement and Control Association International, Inc.
 1. AMCA Standard 500-L Laboratory Methods of Testing Louvers for Rating
 2. AMCA Publication 501 Application Manual for Louvers
2. The Aluminum Association Incorporated
 1. Aluminum Standards and Data
 2. Specifications and Guidelines for Aluminum Structures
3. American Society of Civil Engineers
 1. Minimum Design Loads for Buildings and Other Structures
4. American Society for Testing and Materials
 1. ASTM B209
 2. ASTM B211
 3. ASTM B221
 4. ASTM E90-90
5. Architectural Aluminum Manufacturers Association
 1. AAMA 800 Voluntary Specifications and Test Methods for Sealants
 2. AAMA 605.2 Voluntary Specification for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 3. AAMA TIR Metal Curtain Wall Fasteners
 4. AAMA 2605-98 Superior Performing Organic Coatings on Aluminum Extrusions and Panels
6. Canadian Standards Association
 1. CAN3-S157-M83 Strength Design in Aluminum
 2. S136 94 Cold Formed Steel Structural Members

1.3 SUBMITTALS

1. Product Data
 1. Air flow and water entrainment performance test results.
 2. Material types and thickness.
2. Shop Drawings
 1. Include elevations, sections and specific details for each louver.
 2. Show anchorage details and connections for all component parts.
 3. Include signed and sealed structural calculations.

3. Samples
4. Submit color chips for approval.

1.4 QUALITY ASSURANCE

1. Single subcontract responsibility: Subcontract the work to a single firm that has had not less than six years' experience in the design and manufacturing of work similar to that shown and required.
2. Performance Requirements: Provide AMCA and BSRIA test data as required to confirm that the louvers have the specified air and water performance characteristics.
3. Acoustical Performance: Where applicable, submit test reports to confirm that the louvers meet the specified STC and Noise Reduction requirements
4. Structural Requirements: Design all materials to withstand wind and snow loads as required by the applicable building code. Maximum allowable deflection for the louver structural members to be $l/180$ or 0.75 inch, whichever is less. Maximum allowable deflection for the louver blades to be $l/120$ or 0.50 inch across the weak axis, whichever is less.
5. Professional Engineer Requirements: Drawings and structural calculations to be signed and sealed by a professional engineer licensed to practice in the state of New Jersey (or Mississauga, Ontario).
6. Warranty: Provide written warranty to the owner that all products will be free of defective materials or workmanship for a period of one year from date of installation.

1.5 DELIVERY, STORAGE AND HANDLING

1. Delivery: At the time of delivery all materials shall be visually inspected for damage. Any damaged boxes, crates, louver sections, etc. shall be noted on the receiving ticket and immediately reported to the shipping company and the material manufacturer.
2. Storage:
 1. Material may be stored flat, on end or on its side.
 2. Material may be stored either indoors or outdoors.
 3. If stored outdoors the material must be raised sufficiently off the ground to prevent it being flooded.
 4. If stored outdoors the material must be covered with a weather proof flame resistant sheeting or tarpaulin.
3. Handling:
 1. Material shall be handled in accordance with sound material handling practices and in such a way as to minimize racking.
 2. Louver sections may be hoisted by attaching straps to the jambs and lifting the section while it is in a vertical position.
 3. Louver sections should only be lifted and carried by the jambs. Heads, sills and blades are not to be used for lifting or hoisting louver sections.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. The louvers and related materials herein specified and indicated on the drawings shall be as manufactured by:

2. Products equal to the CS materials may be offered providing that the manufacturer and materials are pre-approved prior to tender close.

2.2 MATERIALS

1. Aluminum Extrusions: ASTM B211, Alloy 6063-T5, 6063-T6 or 6061-T6.
2. Aluminum Sheet: ASTM B3209, Alloy 1100, 3003 or 5005.

2.3 FABRICATION, GENERAL

1. Provide CS louver models, bird screens, blank-off panels, structural supports and accessories as specified and/or shown on the drawings. Materials, sizes, depths, arrangements and material thickness to be as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance.
2. Louvers to be mechanically assembled using stainless steel or aluminum fasteners.
3. Include supports, anchorage, and accessories required for complete assembly.

2.4 LOUVER MODELS

1. CS 4" (101.6mm) High Performance Drainable Fixed Mullion Louver Model A418 or approved equal
 1. Material: Heads, sills, jambs and mullions to be one piece structural aluminum members with integral caulking slot and retaining beads. Blades to be one piece aluminum extrusions. Material thickness to be as follows: Heads: 2mm, Sills: 2.06mm, jambs and mullions: 2.06mm, fixed blades: 2.06mm.
 2. AMCA Performance: A 4' x 4' unit shall conform to the following and be licensed to bear the AMCA seal:

Free Area 0.381 sq. m.)

Intake Pressure drop at the point of beginning water penetration 0.21 H₂O

Exhaust Pressure drop at the point of beginning water penetration 0.43. H₂O

2.5 FINISHES

1. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory. Protect finishes on exposed surfaces prior to shipment. Remove scratches and blemishes from exposed surfaces that will be visible after completing finishing process. Provide color as indicated or, if not otherwise indicated, as selected by architect.
2. 100% Fluoropolymer Resin Powder Coat System complying with AAMA-2605-5 standards for gloss and color retention. Finish thickness to be 1.5 to 3.0 mils.
 1. Finish to allow zero VOCs to be emitted into facility of application or at job site.
 2. Finish to adhere to a 4H Hardness rating.
 3. Furnish manufacturer's twenty (20) year warranty for finish for gloss and color retention

2.6 BIRD SCREENS

1. Unless otherwise indicated, all louvers to be furnished with mill finish bird or insect screens.
2. Screens to be 5/8" (15.9mm) mesh, 0.050" (1.27mm) thick expanded and flattened aluminum bird screen secured within 0.055" (1.40mm) thick extruded aluminum frames. Frames to have mitered corners and corner locks.

2.7 BLANK OFFS

1. Furnish where indicated on the drawings blank-off panels fabricated by the louver manufacturer.
2. Blank-off panels to be 0.050" (1.27mm) thick aluminum sheet. Panels to be finished with Kynar 500 minimum 1 mil (0.025mm) thick full strength 70% resin Fluoropolymer coating. Color to be selected by the architect.

PART 3 EXECUTION

2.1 EXAMINATION:

1. Examine openings to receive the work. Do not proceed until any unsatisfactory conditions have been corrected.

2.2 INSTALLATION

1. Comply with manufacturer's instructions and recommendations for installation of the work.
2. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated and fitted to the structure.
3. Anchor louvers to the building substructure as indicated on architectural drawings.
4. Erection Tolerances:
 1. Maximum variation from plane or location shown on the approved shop drawings: 1/8" per 12 feet of length, but not exceeding 1/2" in any total building length or portion thereof (non-cumulative).
 2. Maximum offset from true alignment between two members abutting end to end, edge-to-edge in line or separated by less than 3": 1/16" (shop or field joints). This limiting condition shall prevail under both load and no load conditions.
5. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.
6. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
7. Set units level, plumb and true to line, with uniform joints.

2.3 PROTECTION

1. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

2.4 ADJUSTING AND CLEANING

1. Immediately clean exposed surfaces of the louvers to remove fingerprints and dirt accumulation during the installation process. Do not let soiling remain until the final cleaning.
2. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to the material finishes. Thoroughly rinse surfaces and dry.
3. Restore louvers and accessory components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Architect, remove damaged materials and replace with new materials.
 1. Touch up minor abrasions in finishes with a compatible air-dried coating that matches the color and gloss of the factory applied coating.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 Do tile work in accordance with Installation Manual 200-1979, "Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit full size sample panels of each colour, texture, size, and pattern of tile.
- .3 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.4 MAINTENANCE MATERIAL

- .1 Provide minimum 15 floor tiles and 5 wall tiles of each type and colour of tile required for project for maintenance use. Store where directed.
- .2 Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - .1 Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - .2 Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.5 ENVIRONMENTAL CONDITIONS

- .1 Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- .2 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 C for 48 h before, during, and 48 h after, installation.

1.6 WARRANTY

- .1 Provide manufacturer's warranty for all accessories that they will be free of defects for a period of five (5) years.

2 - PRODUCTS

2.1 PORCELAIN FLOOR TILES

- .1 Porcelain Tile Shower floors and wall tile): Refer to drawings for wall application. to CAN2-75.1, Type 2, Class MR 1, 50 x 50 size, unglazed, cushion edges, slip resistant tile, complete with trim nosings coves and accessories necessary to complete work.

- Acceptable Product: Ceragres – Unit
Centura – Dotti
Olympia – Quebec Series
Colour and installation pattern to be later selected by consultant.

2.2 WALL TILES

- .1 Porcelain tile: to CAN2-75.1, Type 5, Class MR 34, (CT-3a) 100 x 300 x 6 mm size, glazed, matt glazed, colour as selected by Consultant. Provide matching 150 x 100mm High coved tile at base of all walls.
 - Acceptable Product: Ceragres - Bloc
Centura – Vision (Vitra)
Olympia – Maple Leaf's Colour & Dimensions Series

Colour and installation pattern to be later selected by consultant. Allow for 2 colours

2.3 LEVELERS, UNDERLAYMENTS AND MASTIC MATERIALS

- .1 Products by MAPEI or Armstrong Flooring products shall be deemed acceptable for their intended purpose:
 - .1 For surface preparation and patching: S-184 Fast Setting Patch and Underlayment with S-195 Underlayment Additive by Armstrong Flooring or equal.
 - .2 Mastics for floors: KER 121 polymer-modified thin set mortar by MAPEI or equal.
 - .3 Mastics for ceramic wall tile: KER 907 Ultra/Mastic 1 or equal.
 - .4 Sloped shower floors: Hydraulic cement underlayment "Quikrete" commercial grade floor mud or approved equal, 34.5 MPa compressive strength after 28 days, low sag to ASTM C387
- .2 Water: potable and free of minerals which are detrimental to mortar and grout mixes.
- .3 Dry set mortar: to ANSI A118.1-1976.

2.4 GROUT

- .1 Grout: KER 400 series KERAPOXY grout suitable for the intended use as supplied by MAPEI or approved equal. Coloured grout shall be used where indicated in colour schedule to be later issued by consultant. The Consultant shall have the discretion to use as many of the available colours.
- .2 Grout preparation: to manufacturer's instructions.

2.5 SHOWER BENCH MEMBRANE

- 1 Polyethylene pliable, sheet bonded waterproofing membrane and vapour retarder with fleece webbing vapour permeance of 0.75 perms set into trowelled thin-set mortar. Acceptable product: 'Schluter' – KERDI. Provide all required trims and accessories as necessary to provide watertight installation.

2.6 ACCESSORIES

- .1 Divider strips: Profile to suit specific condition. Refer to drawings for all trims. If not indicated see schedule below:
Colour to be later selected by consultant.

<u>Application</u>	<u>Model</u>	<u>Manufacturer</u>
Outside Corner of Tiled Walls	Rondec	Schluter
Showers	Dilex-HKS	Schluter
Inside corner of Tiled walls	Dilex	Schluter

- .2 Provide all outside corner, inside corner and end trim accessories as required to suit each application. Accessories to match colour of trim.

2.7 MORTAR AND ADHESIVE MIXES

- .1 Scratch coat: 1 part Portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand.
- .2 Slurry bond coat: Portland cement and water mixed to creamy paste. Latex additive may be included.
- .3 Mortar bed for floors: 1 part Portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
- .4 Mortar bed for walls and ceilings: 1 part Portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand.

Latex additive may be included.

- .5 Levelling coat: 1 part Portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
- .6 Bond or setting coat: 1 part Portland cement, 1/3 part hydrated lime, 1 part water.
- .7 Measure mortar ingredients by volume.
- .8 Dry set mortar: mix to manufacturer's instructions.
- .9 Organic adhesive: pre-mixed.

2.8 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

3 - EXECUTION

3.1 WORKMANSHIP

- .1 Apply tile or backing coats to clean and sound surfaces.
- .2 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.
- .3 Maximum surface tolerance 1:800.
- .4 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Lay tiles in pattern as detailed in drawings.
- .5 Lay out tiles so perimeter tiles are minimum 1/2 size or as per drawings
- .6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .7 Install divider strips at junction of tile flooring and dissimilar materials.
- .8 Allow minimum 24 h after installation of tiles, before grouting.
- .9 Clean installed tile surfaces after installation and grouting cured.
- .10 Line grout lines of base with adjacent floor tile grout lines. Apply trim to top of all tile base as detailed.

3.2 FLOOR SEALER, MEMBRANES AND PROTECTIVE COATINGS

- .1 Apply in accordance with manufacturer's instructions.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

- .1 Provide labour, materials, tools and equipment required to prepare the surface and install the materials specified in this section.

1.2 REFERENCE DOCUMENTS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C884/C884M-98(2010), Standard Test Method for Thermal Compatibility Between Concrete and an Epoxy-Resin Overlay.
 - .2 ASTM D570-98 (2010) Standard Test Method for Water Absorption of Plastics.
 - .3 ASTM D635-10, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 - .4 ASTM D638-10, Standard Test Method for Tensile Properties of Plastics.
 - .5 ASTM D695-10 Standard Test Method for Compressive Properties of Rigid Plastics.
 - .6 ASTM D2240- 05 (2010), Standard Test Method for Rubber Property-Durometer Hardness.
 - .7 ASTM D2369-10e1, Standard Test Method for Volatile Content of Coatings.
 - .8 ASTM D2794-93 (2010) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - .9 ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - .10 ASTM D4060-10, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - .11 ASTM D4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - .12 ASTM F2170-11 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - .13 ASTM F2659-10, Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 - .14 ASTM G21-13, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
- .3 International Concrete Repair Institute (ICRI)
 - .1 ICRI Guideline No. 310.2R-2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.
- .4 Underwriters Laboratories of Canada (CAN/ULC)
 - .1 CAN/ULC S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 QUALITY ASSURANCE

- .1 A company having a minimum of five years experience in the application of this type of flooring shall complete the work of this section. The installer must be an "Approved Applicator" of the material manufacturer.

- .2 Before application begins, arrange a site meeting attended by the contractor, the materials manufacturer and the project consultant. Discuss project scope, application procedures, details, inspect and test substrates and review environmental conditions.
- .3 Alternative installation procedures and recommendations must be submitted in writing and approved by the project consultant before commencement of the work.
- .4 Verify the cured thickness of the floor system at random locations chosen by project consultant. Fill test locations flush with surrounding floor tolerance.

1.4 SUBMITTALS

- .1 Submit a letter of certification written by the manufacturer that states the installer is a current "approved applicator" fully trained in the installation of the specified materials.
- .2 Before application begins, submit three copies of the manufacturer's current technical data sheets and installation details for the materials to be used.
- .3 Before application begins, submit three samples 150 mm x 150 mm (6" x 6") representative of the specified finish and selected colour to the project consultant for approval.

1.5 DELIVERY AND STORAGE

- .1 Materials shall be delivered to the project in unopened containers, bearing the manufacturers name, product identification and colour. The applicator must record and retain for future reference the batch numbers of all materials used.
- .2 Store materials indoors in original undamaged condition at a temperature range of 16°C - 30°C (60°F – 85°F) in a dry location.

1.6 SITE CONDITIONS

- .1 Do not install the Work of this Section outside of the following environmental ranges without Manufacturers' written acceptance:
 - .1 Material Temperature: Precondition material for at least 24 hours between 18°C and 30°C (65°F and 86°F).
 - .2 Ambient and Substrate Temperature: Minimum/Maximum 10°/30°C (50°/86°F).
 - .3 Substrate temperature must be at least 3°C (5°F) above measured Dew Point.
 - .4 Mixing and Application attempted at Material, Ambient and/or Substrate Temperature conditions less than 18°C (65°F) will result in a decrease in Product workability and slower cure rates.
 - .5 Relative Ambient Humidity: maximum ambient humidity 85% (during application and curing).
 - .6 Measure and confirm acceptable test results for Ambient Relative Humidity, Ambient and Surface Temperature and Dew Point.
- .2 Substrate Moisture:
 - .1 Moisture content of concrete substrate must be ≤ 4% by mass as measured with a Tramex® CME/CMExpert type concrete moisture meter.
 - .2 Additionally, internal concrete relative humidity tests may be conducted as per ASTM F2170 and values must be ≤ 85%.

- .3 If moisture content of concrete substrate is higher than 4% by mass and / or if relative humidity test results exceed readings of 85% RH, Consultant will instruct on addition of moisture mitigation systems or moisture tolerant primers.
- .3 Supply temporary utilities, including power, water, temporary ventilation and lighting for use by applicator.
- .4 Maintain constant ambient room temperature for 48 hours before, during and after installation or until cured. Minimum temperature of 10°C (50°F) and maximum temperature of 30°C (85°F). Do not apply Product while ambient and substrate temperatures are rising.
- .5 Erect suitable barriers and post legible signs at points of entry to prevent traffic and trades from entering the work area during application and curing period of the floor.
- .6 Ensure adequate ventilation and air flow.

1.7 WARRANTY

- .1 Submit Warranty information in accordance with Section 01 77 00 – Closeout Procedures.
- .2 Submit Applicator's written warranty, signed and issued in the name of Owner warranting the Work of this Section against defects in materials and workmanship for a period of one (1) year from the date of Substantial Performance of the Work.

PART 2 PRODUCTS

2.1. ACCEPTABLE MANUFACTURER

- .1 Sherwin Williams
- .2 MAPEI Inc.
- .3 The manufacturer shall provide a technical representative to be available on 3 days notice to provide help and advice during installation and to ensure the application follows manufacturers recommendations.

2.2 MATERIALS

- .1 Sherwin Williams Armorseal Heavy Duty Floor Coatings equal to Armorseal 8100, B70-8160 Series with H & C Sharkgrip Slip-Resistant Additive.
 - .1 Acceptable equals
 - .1 Sikafloor® 261^{CA} System 1 Sika Canada Inc
 - .2 'Stonhard' GS4 base coat and primary coat along with GS6 topcoat
 - .3 'BASF GP500
 - .4 Mapefloor I 302 SL by MAPEI Inc.
 - .2 Prime Coat: 5-8mils.
 - .3 Body Coat: 12 mils.
- .2 Color: Provide unlimited RAL colour selection, with no minimum order requirement.
- .3 Additional materials: Fill all joints, cracks, depressions or any other surface irregularities using additional materials recommended by the manufacturer of the specified product.

2.3 ACCESSORIES

- .1 Provide all cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturer's specifications.

PART 3 EXECUTION

3.1 INSPECTION

- .1 Prior to commencing work of this section, the applicator shall inspect and test all concrete surfaces and immediately advise in writing to the project consultant and the manufacturer any unsatisfactory conditions which will adversely affect the successful installation of the flooring.
- .2 When the surface preparation is complete and before the application of the flooring begins, complete the following test procedures to confirm the suitability of the concrete.
- .3 Determine if the surface texture of the substrate is comparable to I.C.R.I. Texture CSP 2-3
- .4 Determine the tensile bond strength of the substrate before coating application begins in accordance with CSA A23.2-6B. Minimum acceptable test result is 1.5 MPa (210 psi).
- .5 Determine the Moisture Vapour Transmission properties of the concrete in accordance with ASTM D4263. After 16-24 hours there should be no visible moisture on the plastic sheet. If moisture is found conduct quantitative anhydrous calcium chloride testing in accordance with ASTM F1869. Maximum acceptable test result is 3 pounds per 1,000 ft².
- .6 Determine the surface moisture content by using an impedance moisture meter designed for use on concrete as detailed in ASTM E1907. Acceptable test results shall be 4% by mass or less.
- .7 Determine the Dew Point of the surface to be coated before application. The contractor must monitor the Dew Point during application and initial cure. The surface must be a least 3°C (5.5°F) above the measured Dew Point at all times during application and cure.

3.2 SURFACE PREPARATION

- .1 The substrate surface must be dry, clean and sound. Remove dust, laitance, grease, oil, dirt, curing agents, impregnations, wax, foreign matters, coatings and disintegrated materials from the surface by an appropriate mechanical means, i.e. steel shot blasting, sand blasting or any other method approved by the manufacturer. Surface texture I.C.R.I CSP 2-3.
- .2 Remove all projections and other conditions, which affect the installation of the flooring.
- .3 Protect adjacent surfaces, fixtures and equipment with a drop cloth or adequately cover to prevent damage from splatter, spillage or any other damage resulting from work of this trade.
- .4 Fill all non-moving cracks, control joints, pockmarks, depressions or rough concrete with an epoxy filler.
- .5 Moving cracks and expansion joints must be extended across the flooring system and filled with a flexible product,

3.2 INSTALLATION

-
- .1 Apply materials in accordance with the manufacturers.
 - .2 During application check the wet film thickness of the materials in compliance with ASTM D 4414-84 test method "Measurement of Wet Film Thickness by Notch Gages".
 - .3 Finished work shall match approved samples, be uniform in thickness, sheen, colour, and texture. The finished surface must be free from defects detrimental to appearance or performance of the product.
 - .4 Provide adequate temporary protection until flooring is fully cured.

3.4 CLEANUP

- .1 Remove masking and covering used to protect adjacent surfaces.
- .2 Remove remaining materials and debris from job site and dispose of them in according with local rules and regulations. Leave area in clean condition.

3.4 PROTECTION

- .1 Protect completed floor from damage by trade traffic by suitable means as required.
- .2 Protect completed work from contact with water during initial cure, approximately 24 hours at 20°C (68°F).
- .3 Protect completed flooring from chemical exposure until fully cured, approximately 7 days at 20°C (68°F).

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 - Basic Product Requirements
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 08 11 00 Steel Doors and Frames
- .4 Section 11 16 Aluminum Doors and Frames
- .5 Section 09 29 00 Gypsum Board

1.2 DESCRIPTION

- .1 Section Includes: All labor, materials, tools and other equipment, services and supervision required to complete all interior painting and decorating work as indicated on Finish Schedules and to the full extent of the drawings and specifications.
- .2 The Work shall also include, but not necessarily be limited to surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, making good surfaces and areas, pre-treatment, priming and back-priming to the extent / limits defined under MPI preparation requirements.

1.3 REFERENCES:

- .1 The latest edition of the following reference standards shall govern all painting work:
 - .a Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List. (hereafter referred to as the **MPI** Painting Manual)
 - .b Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
 - .c National Fire Code of Canada.

1.4 QUALITY ASSURANCE:

- .1 This Contractor shall have a minimum of five (5) years proven satisfactory experience and shall maintain a qualified crew of painters throughout the duration of the work.
- .2 All materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual).
- .3 All paint manufacturers and products used shall be as listed under the Approved Product List section of the MPI Painting Manual.
- .4 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.5 PRODUCT DATA

- .1 Submit product data in accordance with Section 01330 - Submittal Procedures.
- .2 Submit full records of all products used. List each product in relation to finish formula and include the following:
 - .1 Finish formula designation.
 - .2 Product type and use.
 - .3 CGSB number.
 - .4 Manufacturer's product number.

- .5 Colour numbers
- .6 Manufacturer's Material Safety Data Sheets (MSDS).
- .7 Maximum VOC classification.
- .8 Eco-Logo certification.

- .3 Submit manufacturer's installation application instructions for each product specified.

1.6 REGULATORY REQUIREMENTS:

- .1 Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.

1.7 SUBMITTALS / MOCK-UP:

- .1 Submit two sets of Material Safety Data Sheets (MSDS) prior to commencement of work for review and for posting at job site as required.
- .2 When requested by the Consultant, prepare and paint a designated surface, area, room or item (in each color scheme) to requirements specified herein, with specified paint or coating showing selected colors, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Indicate on containers or wrappings:
 - .1 Manufacturer's name and address.
 - .2 Type of paint.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well ventilated area with temperature range 7 to 30 C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .10 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
- .11 Remove only in quantities required for same day use.
- .12 Fire Safety Requirements:
 - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Environmental Choice Program
 - .1 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment.
 - .2 Submit CSA Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07. All other surface coatings to be certified to ECP-12.
- .2 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .3 Ventilation:
 - .1 Ventilate enclosed spaces in accordance with Section 01510 - Temporary Utilities.
- .4 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .5 Substrate and ambient temperature must be within limits prescribed in paint standard and by manufacturer to approval of Engineer.
- .6 Maintain minimum substrate and ambient air temperature of 5C for Alkyd and 7C for latex paints. Maximum relative humidity 85%. Maintain supplemental heating until paint has cured sufficiently.
- .7 .Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .8 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .9 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.
- .10 Provide minimum 270 lx on surfaces to be painted.

1.10 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - one four litre can of each type and colour of primer finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
- .3 Deliver to Owner and store where directed.

2 PRODUCTS

2.1 MATERIALS

- .1 Qualified products: only paint materials listed on the **Master Painters Institute Approved Products List** are acceptable for use on this project.

- .2 Qualified products: only paint materials listed to meet the requirements of the environmental choice program, Department of the Environment are acceptable for use on this project.
- .3 Paint materials for each coating formula to be products of a single manufacturer.
- .4 Where required, use only materials having a minimum MPI "Environmentally Friendly" E2 or E3 rating based on VOC (EPA Method 24) content levels. Where indoor air quality (odour) is an issue, use only MPI listed materials having a minimum E2 or E3 rating.

2.2 COLOURS

- .1 Consultant will provide Colour Schedule. Notify Consultant 10 working days before colour schedule required.
- .2 Colour schedule will be based upon the selection of three base colours and three accent colours. No more than three colours will be selected per room / or walls and ceilings.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .5 Perform all colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials allowed only with Consultant's permission.
- .6 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .7 Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity. Where thinner is used, addition shall not exceed paint manufacturer's recommendations.

2.3 Gloss / Sheen Ratings:

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 max.
G2	Velvet finish	0 to 10	10 to 35
G3	Eggshell finish	10 to 25	10 to 35
G4	Satin finish	20 to 35	35 min.
G5	Semi-Gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

- .2 Gloss level ratings of all painted surfaces shall be as specified herein and as noted on Finish Schedule.

3 EXECUTION

3.1 GENERAL

- .1 Perform all painting operations in accordance with CAN/CGSB-85.100 except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.
- .3 Paint all wall surfaces in each room as per finish schedules. Wall surfaces/types may vary in each room. Paint all surfaces as required to meet painting specification for surface type to produce homogenous product.
- .4 General Contractor to finish paint all flush mounted electrical panels to match the adjoining wall colour.

3.2 PREPARATION

- .1 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and all other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

3.3 PROTECTION

- .1 Protect existing building surfaces not to be painted from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products, fixtures, finishes and equipment.

3.4 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Investigate moisture content of surfaces to be painted. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Plaster and wallboard: 12%.
 - .2 Masonry/Concrete: 12%.
 - .3 Concrete Block/Brick: 12%.
 - .4 Wood: 15%.

3.5 CLEANING

- .1 Remove all dust, dirt, and other surface debris.
- .2 Wash surfaces with solution of T.S.P. bleach and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 To prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .5 Clean new metal surfaces to be painted by removing rust, loose mill scale, dirt, grease, oil, or other foreign substances.

3.6 SURFACE PREPARATION

- 1 Prepare all surfaces in accordance with **MPI** requirements. Refer to the **MPI** Painting Manual in regard to specific requirement for the following:

- a) environmental conditions.
 - b) pH testing.
 - c) acid etching.
 - d) rust stain removal.
 - e) vertical and horizontal concrete surfaces.
 - f) clay and concrete masonry units.
 - g) structural steel and miscellaneous metals.
 - h) galvanized and zinc coated metal.
 - i) aluminum and copper surfaces.
 - j) stucco, plaster and gypsum board.
- .2 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .3 Remove and securely store all miscellaneous hardware and surface fittings / fastenings (e.g. electrical plates, mechanical louvers, door and window hardware (e.g. hinges, knobs, locks, trim, frame stops), removable rating / hazard / instruction labels, washroom accessories, light fixture trim, etc. from wall and ceiling surfaces, doors and frames, prior to painting. Carefully clean and replace all such items upon completion of painting work in each area. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes). Doors shall be removed before painting to paint bottom and top edges and then re-hung.
- .4 Protect all adjacent interior surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- .5 Substrate defects shall be made good and sanded by others ready for painting particularly after the first coat of paint. Start of finish painting of defective surfaces (e.g. gypsum board) shall indicate acceptance of substrate and any costs of making good defects shall be borne by the painter including re-painting of entire defective surface (no touch-up painting).

3.7 SURFACE PREPARATION -METAL

- .1 Touch up shop primer to CGSB 85-GP-10M with primer as specified in applicable section. Touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
- .2 Prepare galvanized steel and zinc coated steel surfaces to CGSB 85-GP-16M.
- .3 Prepare copper and copper alloys surfaces to CGSB 85-GP-20M.
- .4 Prepare new steel surfaces exposed normally to dry conditions to CGSB 85-GP-14M.
- .5 Prepare previously painted steel surfaces exposed normally to dry conditions to CGSB 85-GP-15M.
- .6 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.8 MIXING PAINT

- .1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

- .2 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.
- .3 Do not use kerosene or any such organic solvents to thin water-based paints.

1.2 APPLICATION

- .1 Apply paint to CAN/CGSB-85.100. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Sand and dust between each coat to remove visible defects.
- .5 Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.
- .6 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .7 Finish closets and alcoves as specified for adjoining rooms.
- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

1.3 MECHANICAL ELECTRICAL EQUIPMENT

- .1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment. Colour and texture to match adjacent surfaces, except as noted otherwise.
- .2 Do not paint over nameplates.
- .3 Keep sprinkler heads free of paint.
- .4 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .5 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

1.4 RESTORATION

- .1 Clean and re-install all hardware items that were removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Engineer. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

4 PAINT SCHEDULE

4.1 INTERIOR PAINTING

1. Formula 1 (Latex): Semi-Gloss for concrete block and concrete walls. Gloss level 5
 - .1 One coat latex block filler MPI # 4.
 - .2 Two coats latex semi-gloss. MPI # 141
2. Formula 2 (Latex): Semi-Gloss for primed ferrous metal and galvanized and zinc coated metal
 - .1 Two coats MPI # 141
3. Formula 3 (Latex): Interior painted wood work. Gloss level 3
 - .1 One coat primer sealer. MPI #17
 - .2 Two Coats Light Industrial Eggshell, MPI# 151.
4. Formula 4 (Latex): G5 Level for hollow metal doors and frames:
 - .1 primer sealer touch up
 - .2 two coats latex semigloss CAN/CGSB 1.195.
5. Formula 5 (Alkyd): G5 for primed ferrous metal:
 - .1 two coats semigloss enamel CAN/CGSB 1.57.
6. Formula 6 (Alkyd): G% for galvanized and zinc coated metal:
 - .1 one coat cementitious primer CAN/CGSB 1.198.
 - .2 two coats semigloss enamel CAN/CGSB 1.57.
7. Formula 7 (Stain and Varnish finish): (Stain) glulam columns and beams, deck and arches.
 - .1 Provide Sansin SDF, one coat enviro stain - standard - or equal, colour to later selection
 - .2 4 coats of stain required
 - .3 Varnish 2 coats- top of sloped glulam only.
 - .4 Sanding at decking. Pre prep wood.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 351, Construction Specification for Concrete Sidewalk
- .2 ASTM International
 - .1 ASTM A327/A327M-11, Standard Test Methods for Impact Testing of Cast Irons
 - .2 ASTM A48/A48M-03(2012), Standard Specification for Gray Iron Castings.
 - .3 ASTM B117-11, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - .4 ASTM C501-84(2009), Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
 - .5 ASTM C1028-07, Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
 - .6 ASTM D543-14, Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - .7 ASTM D570-98(2010)e1 Standard Test Method for Water Absorption of Plastics.
 - .8 ASTM D638-14, Standard Test Method for Tensile Properties of Plastics.
 - .9 ASTM D790-10, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - .10 ASTM G151-10, Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources.
 - .11 ASTM G155-13, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-metallic Materials
 - .12 ASTM E84-15a, Standard Test Method for Surface Burning Characteristics of Building Materials.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 Contractor shall submit shop drawings at least two weeks before TWSI installation showing the proposed arrangement at each TWSI location, and the width as shown on the Contract Drawings, and the width achieved by the proposed TWSI, for review by the Contract Administrator.
 - .2 When requested by the Contract Administrator, Contractor shall provide written confirmation that selected TWSI product meets applicable material specifications.
 - .3 TWSI's shall be 610 in depth, to the width as shown on the Contract Drawings.
 - .4 Plates shall be parallel with the edge of concrete (i.e. not necessarily perpendicular to the direction of pedestrian travel).

1.3 ACCESSIBILITY DESIGN STANDARDS

- .1 Ontario Regulation 191/11: Integrated Accessibility Standards Part IV.1 – Design of Public Spaces Standards (Accessibility Standards for the Built Environment), as amended.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 TACTILE WALKING SURFACE INDICATORS (TWSI)

- .1 Contractor shall provide shop drawings of TWSI products that meet the width of the TWSI required at each specific location as shown on the Contract Drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of aggregates previously installed under other Sections are acceptable for concrete placement.
 - .1 Visually inspect aggregate.
 - .2 Prepare for cast-in-place concrete work to CSA A23.1/A23.2 and OPSS 351.

3.2 INSTALLATION

- .1 All installations shall be completed in accordance with:
 - .1 The contract drawings; and
 - .2 The Manufacturer's recommended installation procedures; and
 - .1 Install TWSI's in conjunction with Cast-in-Place concrete.
 - .2 Tops of TWSI's shall be aligned and level with the adjacent concrete surface and installation in wet concrete shall be effective in permanently securing the TWSI in place once dry.

3.3 CLEANING

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

3.4 PROTECTION

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

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

- .1 Sections 10 50 00 & 10 28 00, Washroom & Miscellaneous Specialties.

1.3 REFERENCES

- .1 ASTM A167-92b - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.4 SUBMITTALS

- .1 Shop drawings: Submit shop drawings for toilet partitions, urinal screens and change cubicles in accordance with C.C.5 of General Conditions of the Contract. Show and describe in detail materials, finishes, dimensions, details of connections and fastenings, elevations, plans, sections, metal thicknesses, hardware and any other pertinent information. Submit colour samples.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in sequence to meet installation schedule. Provide protection from marring and other damage.
- .2 Carefully unload materials; handle and store in a manner to prevent damage. Remove unsatisfactory materials and replace to Consultant's satisfaction at no cost to Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Acceptable Manufacturers: Hadrian, Shanahan, Bobrick, Bradley, Global Partitions or approved alternate.
- .2 Ceiling Hung Partitions: Embossed stainless steel.
- .3 Bolts, Spacers and Bushings: Manufacturer's stainless-steel standard, of type to adequately secure pilasters to channels.
- .4 Hinges: Adjustable, bottom hinge having cam units activated by spring, concealed within door, with zytel or nylon bearings. Stainless steel construction.
- .5 Finish: Type 304, embossed stainless steel with 5WL pattern.

2.2 FABRICATION

- .1 Take Site measurements and fabricate partitions (and screens) to suit Site dimensions.
- .2 Accurately follow methods of fabrication reinforcement and anchorage indicated on reviewed shop drawings.

- .3 Cut shear, straighten and work panel in a manner to prevent disfigurement of finished work. Finish and slightly radius edges.
- .4 Ensure finished work is free of warp, open seams, buckles and other surface defects detrimental to appearance.
- .5 Provide stainless steel hardware conforming to ASTM A167. Include pilaster stainless steel shoes, hinges, latch and keepers, rubber cushioned door bumper, 1 coat hook per door and fastening brackets.

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Perform drilling of steel, masonry or concrete necessary to install work.
- .2 Install toilet partitions, and cubicles plumb and square and according to manufacturer's printed instructions by anchoring securely to floor and walls and ceiling. Provide anchorage devices and attachments to suit design.
- .3 Install hardware and ensure it is vertically aligned.
- .4 Hang doors and adjust hinges of doors to operate properly and as directed by Architect (hang closed at rest). Barrier free stall unit shall be closed at rest.
- .6 Where partition or screen abuts wall, attach with continuous wall channels. Bolt channels to walls and partition so there are no gaps.
- .7 Touch up damaged shop paint to match.
- .8 Clean and make good surfaces soiled or damaged. Replace materials that cannot be satisfactorily cleaned and restored as determined by Consultant.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED SECTIONS

- .1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

- .1 Phenolic toilet partitions: Section 10 21 13, Toilet Partitions.

1.3 REFERENCES

- .1 ASTM A167-91, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A525M-91b, Specification for General Requirements for Steel sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process Metric.
- .3 ASTM A526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .4 ASTM B456-91a, Specification for Electrodeposited Coating of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .5 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
- .6 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
- .7 CAN/CGSB-12.5-M86, Mirrors, Silvered.
- .8 CGSB 31-GP-107Ma-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .9 CAN/CSA-B651-M90, Barrier-Free Design.
- .10 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Carefully wrap and package accessories to ensure protection during shipping and storage.
- .2 Store accessories inside building in location directed and in well identified package as to contents.

1.6 EXTRA MATERIALS

- .1 Provide special tools required for accessing, assembly/ disassembly or removal for toilet and bath accessories in accordance with requirement specified in Section 01 78 00 – Closeout Submittals.

1.7 WARRANTY

- .1 Submit warranty against defects in accordance with GC 12.3 but for (5) five years.

PART 2 – PRODUCTS

2.1 MANUFACTURED UNITS

- .1 Owner will supply and contractor to install the following washroom accessories:
 - .1 Soap dispenser
 - .2 Paper Towel dispenser
 - .3 Toilet Paper dispenser
 - .4 Garbage cans
- .2 Contractor will supply and install all other washroom accessories as listed below in this section.
- .3 Acceptable manufacturers: Hadrian, Fiat, Bobrick, Bradley and Watrous or approved alternate.
 - .1 For the purposes of this specification, Bobrick model numbers have been specified. Equal products manufactured by Hadrian, Fiat, Bradley or Watrous, will be accepted as approved by consultant.
- .4 Grab bars (GB1, GB2):
 - .1 Provide the following grab bars as indicated on drawings.
 - .1 Grab Bar 1 (**GB1**) – Minimum 600mm in length, wall mounted horizontally behind water closet as indicated on drawings. Mounting height between 840mm to 920mm above finished floor and, where the water closet has a tank, be wall mounted 150mm above the tank.
 - .2 Grab Bar 2 (**GB2**) – Continuous L-shaped with 750mm long horizontal and vertical components, location as indicated on drawings. Grab bar shall be wall mounted with horizontal component 750mm above the finished floor and the vertical component 150mm in front of the water closet.
 - .2 Grab bars shall be minimum 18 gauge thick, between 35 to 40mm diameter tubular stainless steel, slip-resistant surface with welded concealed flanges and peened surface on straight lengths.
 - .3 Grab bars shall have concealed non-corrosive anchorage systems of types approved by Consultant.
 - .4 Grab bars shall be anchored to anchorage system with concealed stainless steel fasteners. Grab bar material and anchorage shall withstand a load of 300 lbs. (1.3 kN) applied vertically or horizontally.
 - .5 Grab bars shall have a clearance of 50mm from the wall.
- .5 Mirrors: Mirror shall have a one-piece stainless steel channel frame, 13mm x 13mm x 9.5mm with 90 deg. mitred corners; all exposed surfaces shall have bright polished finish. Mirror shall be polished stainless steel 600 x 900 mm, tempered glass. Corners shall be protected by friction-absorbing filler strips. Back of all glass mirrors shall be protected by full-size, shock-absorbing, water-resistant, non abrasive, 3/16" thick polyethylene padding Galvanized steel back shall have integral horizontal hanging brackets located near top for mounting on concealed wall hangers.
 - .1 Acceptable product: M1 Model B-166 24 36 as manufactured by Bobrick. M2- Model B-1658 as manufactured by Bobrick.
 - .2 Bottom of mirror to be 1000mm above the floor and centred above the vanity.
- .6 Hook Strip: Stainless Steel: Bobrick B231x24
- .7 Shower Seat: reversible wall-mounted, folding seat; equivalent to Bobrick #B-5181. Mount in barrier-free shower.
- .8 Recessed soap holder in Shower Stall; Bobrick, B-4390.

- .9 Change table: Surface mounted changing station equipped to support 113kg when installed. Manufactured by Bobrick Koala Model KB200 or equal.

2.2 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.3 FINISHES

- .1 Chrome and nickel plating: to ASTM B456, polished finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107Ma, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats.
- .3 Manufacturer's or brand names on face of units not acceptable.

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
 - .3 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
 - .4 Toilet/shower compartments: use male/female through bolts.
- .2 Install grab bars on built-in anchors provided by bar manufacturer. Supply templates, details and instructions for building in anchors in toilet compartments. Provide through bolt fastening of grab bars in toilet compartments. Ensure code-compliant clearances between grab bars and walls.
- .3 Use tamper proof screws/bolts for fasteners.
- .4 Fill units with necessary supplies shortly before final acceptance of building.

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- .6 Locate accessories where indicated on the drawings and/or as directed by the Consultant.
 - .7 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651-12 and manufacturer's instructions.
 - .7 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking has been installed properly.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Comply with manufacturer's recommendations for backing and proper support.
 - .4 Use fasteners and anchors suitable for substrate and project conditions
 - .5 Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 - .6 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .7 Test for proper operation.

3.2 CLEANING

- .1 Proceed in accordance with Section 01740 – Cleaning.
- .2 Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- .3 Touch-up, repair or replace damaged products until Substantial Performance.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTAL

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for all equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit type and number of fasteners to be used for all installation for approval by Contract Administrator.
- .2 Shop Drawings:
 - .1 Submit shop drawings indicating dimensions, sizes, assembly, anchorage and installation details for each furnishing specified, where applicable.
 - .2 Shop drawings stamped by a licensed structural Engineer shall be required for but not limited to all equipment anchorage (e.g., footings and/or stringer assembly) and other elements/components deemed necessary by the Town of Marathon and/or Contract Administrator.
- .3 Samples:
 - .1 Submit representative samples of all materials to be used under this specification, to a testing laboratory approved by the Contract Administrator for approval of their quality and nature prior to installation as required. Cost to be paid by the contractor
 - .2 The Contract Administrator may require additional field and/or laboratory tests of the materials during installation to ensure that the materials are satisfactory. This shall be carried out at no extra cost to the contract.

1.2 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data, including maintenance kits, and applicable manuals, as well as drawings, warranty and CSA Compliance Certificate to the Contract Administrator for the use of the Town of Marathon.

1.3 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 GENERAL CONDITIONS

- .1 Furnishings installed on concrete should be fastened using stainless steel anti-vandal proof hardware. See manufacturer or supplier for further recommendations and requirements.
- .2 All components to be firmly fastened. End-caps on benches that are secured with rivets will require additional reinforcement with pan-head tamper-proof fasteners to ensure protection against vandalism. Location and type of fastener to be indicated on shop drawing submissions.
- .3 Materials must comply with ASTM F3101-15.

2.2 EQUIPMENT

- .1 Play equipment:
 - .1 Acceptable material: as shown on contract drawings or approved equal.
 - .2 Materials must meet or exceed ASTM F1292-13, ASTM F2075-15, CAN/CSA Z614-14 standards, and Annex H.
 - .3 The labels - rigid permanent material, should be UV stable and scratch resistant and should be bilingual (English and French), must include date of manufacture, manufacturer contact information, intended user age group for equipment.
- .2 Maintenance Kits: Supplier is responsible to provide the following tools and products in the form of a kit or box.
 - .1 Graffiti remover with instructions.
 - .2 Touch-up paint for all colours and fine grit sand paper.
 - .3 One (1) set of keys or special tools required for maintaining the structure for all hardware.
 - .4 One (1) copy of the warranty certificate for the Town of Marathon's file.
 - .5 Five (5) sets of spare hardware and one (1) set of end caps for each colour.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed and inspected under other Sections or Contracts are acceptable for equipment installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect surface.
 - .2 Verify all underground utilities and dimensions in the field and immediately report all discrepancies or findings to the Contract Administrator.

- .3 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2 TEMPORARY CONSTRUCTION FENCE

- .1 A temporary fence shall be erected to ensure the security of the work zone and equipment.
- .2 The fence must be at least 1.2m in height and constructed of rigid or framed materials (e.g., Modu-Loc fence or approved equivalent) with posts +/-3.0m apart, such that it cannot be altered.
- .3 The fence shall be erected to provide a continuous barricade around the designated work area(s).
- .4 The location of the fence must be reviewed and approved by the Contract Administrator before installation.
- .5 Installation shall occur prior to the equipment arriving onsite and be maintained by the Contractor for the duration of construction.
- .6 The fence is to remain in place until the equipment is taken over by the Town of Marathon for maintenance.

3.3 INSTALLATION

- .1 Date of Installation to be provided to the Contract Administrator a minimum of 2 business days prior to installation.
- .2 Assemble furnishings in accordance with manufacturer's written recommendations.
- .3 Do not use silicone caulking or other material to close gaps due to ill-fitting components.
- .4 Install equipment true, plumb, as indicated.
- .5 Touch-up damaged finishes to approval of Contract Administrator.

3.4 CLEANING

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

3.5 INSPECTION

- .1 Certified playground inspector must inspect the installed play structures, components and their layouts and provide written documents to the Town that they meet or exceed the latest ASTM, CSA standards (CSA Z614) including Annex H at the conclusion of the project. There is to be a minimum of 2 (two) inspections.
- .2 The first inspection shall include a review of the subsurface installation including all welds, stringers, fasteners and other installation details and components, upon their completion but prior to the installation of playground safety surfacing. All identified issues and deficiencies are to be corrected before further installation may occur.

- .3 The second inspections shall occur upon the completion of the assembly and installation of all playground components including play structure, playground safety surfacing, playground edging, accessible ramps and routes.
- .4 The playground installer must be present for all inspections.
- .5 Identified deficiencies, if applicable, will be communicated electronically in writing to the Contract Administrator, and the Contractor for relay to the installer and manufacturer of the equipment.
- .6 The Contractor assumes all liability associated with the play equipment until such a time as the play equipment has passed a final inspection by the Inspector and the Town of Marathon.
- .7 The Contract Administrator will coordinate subsequent inspections until all deficiencies have been addressed.
- .8 Contractor price shall include installer coordination and mobilization and inspection until the playground has been approved by the certified playground inspector and reviewed and inspected by Town of Marathon staff.
- .9 Upon inspection and receipt to the satisfaction of the Contract Administrator, the Play Equipment is taken over by the Town of Marathon for maintenance.

3.6 PROTECTION

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

3.7 BASIS OF PAYMENT

- .1 A markup percentage as indicated in the contract documents will be retained until the playground has been accepted by the Town of Marathon and approved by the certified playground inspector.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- .1 In general, the work of this section shall include the clearing, grubbing, excavating, engineered fill, backfilling and rough grading for all the asphalt and sidewalk areas which are indicated on the drawings.
- .2 This section does not include excavation for removal or trenching for underground piping.

1.2 RELATED SECTIONS

- .1 Section 32 12 16.01 Asphalt Paving Short Form.

1.3 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS). All OPSS references shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial oriented specification is specified in the Contract Documents.
- .2 Ontario Provincial Standard Specification (OPSS)
 - .1 OPSS 180 Nov 2016 – General Specification for the Management of Excess Materials
 - .2 OPSS 501 Nov 2017 – Construction Specification for Compacting
 - .3 OPSS 517 Nov 2018 – Construction Specification for Dewatering of Pipeline Utility and Associated Structure Excavation.
 - .4 OPSS 805 Nov 2018 – Construction Specification for Temporary Erosion and Sediment Control Measures.
 - .5 OPSS 1010 Nov 2013 - Material Specification for Aggregates-Base, Subbase, Select Subgrade, and Backfill Material.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 REGULATORY REQUIREMENTS

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Ontario Occupational Health and Safety Act Ontario Regulation 213/91.
- .2 Shore and brace excavations, protect slopes and banks and perform work in accordance with Ontario Occupational Health and Safety Act Ontario Regulation 213/91.

1.5 SUBMITTALS

- .1 Working Drawings for Soil Protection Systems bearing stamp and signature of a qualified professional engineer when required by the Ontario Occupational Health and Safety Act.

1.6 DRAWINGS

- .1 Refer to Drawing C1 and C2 which is included to show the existing and final grades.

1.7 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Notify Public Utilities in advanced of planned excavations adjacent to their services. Take care not to damage or displace encountered services. When such services are encountered notify the Consultant immediately and protect, brace and support the service. Advise consult which services require adjustment, relocation or abandonment. Where work on these services becomes necessary use following procedure:
 - .1 Essential Services: Make necessary repairs only to maintain essential services satisfactory to the Consultant and authorities having jurisdiction.
 - .2 Known Services: Repair promptly at no expense to the Owner.
 - .3 Unknown Services: Repair promptly on Consultant's instruction. Submit complete breakdown of cost of such work. Amount approved will be added to Contract Sum.
 - .3 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

1.1 MEASUREMENT

- .1 Measurement of Excavation shall be by volume in cubic metres measure in its original position and based on cross section end areas.
- .2 Measurement of Granular B Type I & Type II shall be by mass in tonnes.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Aggregates in accordance with OPSS 1010.
 - .1 Granular B Type I & Type II

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.
- .2 Implementation, inspection, maintenance and removal of erosion and sediment controls measures shall be in accordance with OPSS 805. Alternative materials or methods are

acceptable provided they meet industry standards and protect the environment from the impacts of erosion and sedimentation.

- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION/PROTECTION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.
- .3 Protect excavations from freezing.
- .4 Keep excavations clean, free of standing water, and loose soil. Dewatering shall be in accordance with OPSS 517.
- .5 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.
- .6 Protect buried services that are required to remain undisturbed.
- .7 Establish accurate lines and levels as required and supply batter boards, line stakes and templates and establish permanent reference lines and benchmarks as required.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas approved by Consultant.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.4 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
 - .1 In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.
- .2 Remove concrete, masonry, paving, walks, and other obstructions encountered during excavation.
- .3 Proof-roll subgrade with fully loaded tandem axle truck to detect soft areas or silt. Soft areas or silt shall be repaired as directed by the Consultant.
- .4 Excavation shall be completed using an excavator with a smooth bladed bucket and operating from the edge of the excavation to minimize disturbance to the exposed subgrade.
- .5 Construct frost tapers for utility, water or sanitary services, or storm sewer trenches traversing asphalt paving or concrete walkways.

- .6 Construct frost tapers for each excavation and at the limits of the Basic Pavement Strategy to mitigate differential heaving between the existing subgrade soils and the new granular fill.
- .7 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .8 Restrict vehicle operations directly adjacent to open trenches.
- .9 Correct unauthorized over-excavation as follows:
 - .1 Fill with Granular B Type I compacted in accordance with OPSS 501.
- .10 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.

3.5 GRADING

- .1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other areas indicated.
 - .1 Grade to be gradual between finished spot elevations shown on drawings.
 - .1 Rough grade to 200 mm below finished grade for grassed areas.
 - .2 Rough grade a minimum of 550 mm below finished grade for asphalt paving or deeper as necessary to achieve minimum pavement structures and to remove buried organics.
 - .2 Grade to levels, profiles and contours allowing for surface treatment as indicated.
 - .3 Scarify subgrade on which topsoil is to be placed, to the minimum depths specified.
 - .4 Import and grade earth borrow as necessary to achieve finished grades outside of asphalt paving and concrete walkways.
 - .5 Do not grade when soils are saturated or frozen.

3.6 BACKFILLING

- .1 Backfilling shall not commence until fill material and subgrade has been inspected and approved by Consultant.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled. Do not place material which is frozen or place material on frozen surfaces.
- .3 Compaction of subgrade: compact existing subgrade under walks, paving to same compaction as specified for fill.
- .4 Place a layer of geotextile, 370R or approved equivalent on approved subgrade.
- .5 Backfill excavation of buried organics with Granular B Type II to bottom of granular base or subbase as indicated in the drawings. Place backfill in maximum 300 mm compacted lift thickness and compact to OPSS 501. Compact granular material to 98% SPMDD.
- .6 Backfill asphalt paving areas in accordance with Section 32 12 16.01 Asphalt Paving Short Form.

3.7 SHORTAGE AND SURPLUS

- .1 Supply necessary granular fill to meet backfilling and grading requirements.
- .2 Contractor shall manage excess material in accordance with O.Reg. 406/19: On-Site and Excess Soil Management.
- .3 Dispose of surplus material off site in accordance with OPSS 180.

3.8 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Reinstall pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .3 Protect newly graded areas from traffic and erosion.

3.9 QUALITY CONTROL

- .1 The Proponent shall retain the services of a consulting firm with CCIL Certified Lab Type-C designation for Quality Control testing of materials and compaction of aggregates.
- .2 Quality Assurance test results shall be used for the acceptance of aggregates, except when referee testing has been carried out. Quality Control sampling and testing shall be in accordance with OPSS 1010.
- .3 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Underwriters' Laboratories of Canada (ULC)
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 206, Construction Specification for Grading
 - .2 OPSS 501, Construction Specification for Compacting
 - .3 OPSS 510, Construction Specification for Removal
- .3 ASTM International
 - .1 ASTM D698-12e2, Test Method for Laboratory Compaction Characteristics of
 - .2 Soil Using Standard Effort (600 kN-m/m³).

1.2 EXISTING CONDITIONS

- .1 Contractors shall review the site to familiarize themselves with the existing site and topographic conditions and to determine extent and scope of rough grading work.
- .2 The Contractor will be required to work around underground utilities, and when construction operations are liable to damage utilities, the Contractor will be required to alter his method of construction as directed by the Contract Administrator or utility company in order to avoid any damage, at no additional cost to the contract.
- .3 Contractor shall employ qualified surveyor at their expense to set finished grade stakes and maintain grade control and layout for the park work.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Quality Control:
 - .1 Submit condition survey of existing conditions.
 - .2 Submit to Contract Administrator notice when bottom of excavation is reached.
 - .3 Inform Contract Administrator at least 4 weeks prior to beginning Work, of proposed source of fill materials. Refer to 2.1.3 for testing requirements.
 - .4 A minimum of 14 Days prior to borrow material being used in the Work, the Contractor shall provide a list of intended borrow sources and the tonnage that is expected to be used from each source to the Contract Administrator.
 - .5 Submit two copies of contamination testing results prepared by a Qualified Person, to the Contract Administrator. Materials to be tested to section 2.1.3.
 - .6 Qualified Person is defined as a Professional Engineer or Geoscientist, as specified by Ontario Regulation 153/04 Records of Site Condition – Part XV.1 of the *Environmental Protection Act*.
- .2 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority location plan of relocated and abandoned services, if requested.

Part 2 Products

2.1 MATERIALS

- .1 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Contract Administrator.
- .2 When borrow is specified in the Contract Documents for backfill requirements, borrow shall be according to OPSS 212.
- .3 All fill must be tested for contaminants. The Contractor shall provide written documentation demonstrating that the Contractor has fulfilled the following requirements:
 - .1 A minimum of three representative soil samples of every proposed source of imported fill shall be collected by or under the supervision of a Qualified Person.
 - .2 A minimum of three representative soil samples of native fill to be re-used on site are also required to be tested.
 - .3 The collection of soil samples to be in accordance with the OMAFRA Field Quality Control methods outlined in the 2012 Sampling and Analysis Protocol for Ontario Regulation 267/03 Made under the Nutrient Management Act, 2002.
 - .4 Mix samples together thoroughly before submitting for testing.
 - .5 Soil samples are to be tested by an accredited analytical laboratory designated by the Contract Administrator. The contractor is responsible for the cost of this testing. Testing is to be done to the following parameters:
 - .1 Concentration of contaminants: Typical contaminants parameters shall include, as a minimum, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), and organochloride pesticides. Any additional contaminant parameters to be tested shall be identified by the Qualified Person based on the historic or present use of the property from which the fill is sourced, any potentially contaminating activities that may have taken place thereon, or known environmental conditions that may impact the quality of the fill.
 - .2 The condition of the proposed fill source compared to the appropriate Site Condition Standards established by the Ontario Ministry of the Environment and Climate Change as provided by the Ontario Soil, Ground Water and Sediment Standards for Use under part XV.1 of the Environmental Protection Act dated April 15, 2011 and as may be amended from time to time and in effect at the time the park construction is begun. The Site Condition Standards shall be those applicable to the receiving property (park is Table 3) as determined based on ground water use, soil texture and land use.
 - .6 Submit two copies of soil analysis prepared by a Qualified Person and recommendations for corrections if required, to the Contract Administrator.
 - .7 Fill failing to meet the applicable Site condition standards for the receiving site shall not be imported under any circumstances.
 - .8 Native fill failing to meet the applicable standards, may not be re-used in the park construction.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed are acceptable for rough grading installation.

- .1 Visually inspect substrate.
 - .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery. Unsuitable materials, other than swamp material, shall be removed below the subgrade to the lengths, widths, and depths specified in the Contract Documents. The resulting excavation shall be backfilled with approved material and compacted.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.
 - .4 Verify location of all existing structures, underground services and survey monuments prior to beginning site grading. Notify the Landscape Architect in writing of any damage to existing structures prior to beginning of any work. Protect existing structures from damage.
 - .5 All ice and snow shall be removed from any earth excavation and embankment areas under construction
- .2 Where over-excavation occurs, it shall be backfilled with approved material and compacted. When boulders are encountered in the excavated slopes, the boulders shall be removed, when directed by the Contract Administrator, and the cavity backfilled with approved material and compacted.

3.2 STRIPPING OF TOPSOIL

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

3.3 GRADING

- .1 Rough grading shall be done by excavating or filling, as required to the level of the subgrade surface. Fill sections shall only be constructed of stable soils without vegetable materials and shall be deposited and compacted in layers not exceeding 300mm. Contractor shall import fill materials, as necessary, if required to complete rough grading.
- .2 Each layer shall be shaped and compacted to the line and cross-section specified before the succeeding layer is placed. Compaction to OPSS 501 and to the following parameters:
 - .1 85% Standard Proctor Maximum Dry Density under landscape areas,
 - .2 95% Standard Proctor Maximum Dry Density under pavement areas.
- .3 Remove any foreign debris, stone, concrete, steel, wood, etc., larger than 100mm (4") off site, at no extra cost to the contract. Note that pebbles larger than 100mm, found in the subgrade can be retained for play feature in the playground area. As directed by Landscape Architect.
- .4 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Contractor to utilize qualified surveyor at their expense to set park and perimeter finished and rough grade stakes.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Trim entire site to uniform slopes. Trimming of grades includes elimination of soft areas or poor soils.
- .7 Do not disturb soil within branch spread of trees or shrubs to remain.
- .8 The site shall be left at all times in such a way that flooding, ponding or puddling of the subgrade will not occur. If necessary and when directed by the Landscape Architect, the Contractor shall provide temporary relief swales or ditches at no extra cost to the contract.

- .9 Verify all critical grades to ensure positive drainage.
- .10 Notify the Landscape Architect in writing of any poorly compacted areas.
- .11 Strip and remove or stockpile for future use all material that can be used for future work following appropriate approval.
- .12 Maintain finished subgrade until topsoiling and installation of granular base is complete. Correct all erosion or settlements.

3.4 TESTING & QUALITY CONTROL

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by ULC. Costs of tests will be paid by Contractor as part of Rough Grading line item.
- .2 Submit testing procedure, frequency of tests, to Contract Administrator for approval.
- .3 The Contractor shall be responsible for carrying out all quality control grade checks to ensure that horizontal and vertical grading tolerances are met.
- .4 All grade checks relating to horizontal and vertical grading tolerances, including all non-compliances, shall be submitted to the Contract Administrator within 2 Business Days following completion of the grade.

3.5 CLEANING

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

3.6 PROTECTION

- .1 Protect or transplant existing trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as indicated. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

3.7 APPROVALS

- .1 Obtain approval from the Contract Administrator of all finished and prepared rough grades. Adjustments to grades not satisfactory to the Landscape Architect shall be trimmed under the direction of the Landscape Architect prior to commencing topsoil spreading or installation of base materials.
- .2 At completion of park construction, the Contractor shall survey the site to provide verification that the site grading is in conformance with the design grades shown on the drawings.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-88, Sieves, Testing, Woven Wire, Metric.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .2 CSA-A3001-13, Cementitious Materials for Use in Concrete.
 - .3 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .3 Province of Ontario, Occupational Health and Safety Act, Ontario Regulation 213/91, Construction Projects, 2017
- .4 Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), 2012 Sampling and Analysis Protocol for Ontario Regulation 267/03, under the Nutrient Management Act, 2002.
- .5 Ontario Ministry of Transportation Publications, LS-702, Determination of Particle Size Analysis of Soils
- .6 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 206, Construction Specification for Grading
 - .2 OPSS 492, Construction Specification for Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures,
 - .3 OPSS 501, Construction Specification for Compaction
 - .4 OPSS 510, Construction Specification for Removal
 - .5 OPSS 401, Construction Specification for Trenching Backfilling and Compacting;
 - .6 OPSS 212, Construction Specification for Earth Borrow,
 - .7 OPSS 1010, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material,
- .7 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-13, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
 - .3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .4 ASTM D1557-07(2012), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .5 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.2 DEFINITIONS

- .1 Excavation classes:
 - .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

- .2 Topsoil: To section 32 91 19.13, Topsoil Placement and Grading, and:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .3 Waste Material: excavated material unsuitable for use in work or surplus to requirements.
- .2 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
 - .1 Earth borrow shall consist of earth as defined in OPSS 212 and shall be free from organic and foreign material.
 - .2 Earth borrow with at least 50% of its particles by mass between 5 and 75 µm in size, as determined using LS-702, shall be considered frost-susceptible, and not acceptable for use above the frost penetration depth, wherever specified in the Contract Documents.
- .3 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Refer to 1.2.3 – Borrow Material, and
 - .2 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
 - .3 Table:

Sieve Designation	% Passing
2.00mm	100
0.10mm	45-100
0.02mm	10-80
0.005mm	0-45
 - .4 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Occupational Health and Safety:
 - .1 All forms required by O Reg 213/91 to be completed and filed with the appropriate authorities.
 - .2 The contractor shall provide to the Contract Administrator a copy of the procedures to be followed in the event of an emergency.
- .2 Quality Control:
 - .1 Submit condition survey of existing conditions.
 - .2 Submit to Contract Administrator notice when bottom of excavation is reached.
 - .3 Inform Contract Administrator at least 4 weeks prior to beginning Work, of proposed source of fill materials. Refer to 2.1.5 for testing requirements
 - .4 A minimum of 14 Days prior to borrow material being used in the Work, the Contractor shall provide a list of intended borrow sources and the tonnage that is expected to be used from each source to the Contract Administrator.
 - .5 Submit two copies of contamination testing results prepared by a Qualified Person,

to the Contract Administrator. Materials to be tested to section 2.1.5.

- .6 Qualified Person is defined as a Professional Engineer or Geoscientist, as specified by Ontario Regulation 153/04 Records of Site Condition – Part XV.1 of the Environmental Protection Act.

.3 Preconstruction Submittals:

- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority location plan of relocated and abandoned services, if requested.

1.4 QUALITY ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Do not use imported material until written report of soil test results are approved by Contract Administrator.
- .3 The Contractor shall be responsible for carrying out all quality control grade checks to ensure that horizontal and vertical grading tolerances are met.
- .4 All grade checks relating to horizontal and vertical grading tolerances, including all non-compliances, shall be submitted to the Contract Administrator within 2 Business Days following completion of the grade.
- .5 The Contract Administrator reserves the right to visually inspect borrow and reject any borrow material that does not meet the requirements specified herein and elsewhere in the Contract Documents.

1.5 EXISTING CONDITIONS

- .1 Buried services: The Contractor will be required to work around underground utilities, and when construction operations are liable to damage utilities, the Contractor will be utility company in order to avoid any damage.
 - .1 Before commencing work verify or establish location of buried services on and adjacent to site.
 - .2 Where utility lines or structures exist in area of excavation, obtain direction of Contract Administrator before proceeding.
 - .3 Arrange with appropriate authority for relocation of buried services that interfere with execution of work.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation work, notify applicable Contract Administrator and authorities having jurisdiction to establish location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
 - .6 Confirm locations of buried utilities by careful test excavations.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
- .2 Existing buildings and surface features:
 - .1 Protect existing buildings and surface features from damage while Work is in

- progress. In event of damage, immediately make repair as directed by Contract Administrator
- .2 Where required for excavation, cut roots or branches with direction from and to the approval of the Contract Administrator.

Part 2 Products

2.1 MATERIALS

- .1 Crushed, pit run or screened stone, gravel or sand.
- .2 Gradations to be within limits specified when tested to ASTM C136, ASTM C117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
- .3 For topsoil, refer to Section 32 91 19.13, Topsoil Placement and Grading.
- .4 When borrow is specified in the Contract Documents for backfill requirements, borrow shall be according to OPSS 212.
- .1 All fill must be tested for contaminants. The Contractor shall provide written documentation demonstrating that the Contractor has fulfilled the following requirements:
- .1 A minimum of three representative soil samples of every proposed source of imported fill shall be collected by or under the supervision of a Qualified Person.
- .2 A minimum of three representative soil samples of native fill to be re-used on site are also required to be tested.
- .3 The collection of soil samples to be in accordance with the OMAFRA Field Quality Control methods outlined in the 2012 Sampling and Analysis Protocol for Ontario Regulation 267/03 Made under the Nutrient Management Act, 2002.
- .4 Mix samples together thoroughly before submitting for testing.
- .5 Soil samples are to be tested by an accredited analytical laboratory designated by the Contract Administrator. The contractor is responsible for the cost of this testing. Testing is to be done to the following parameters:
- i. Concentration of contaminants: Typical contaminants parameters shall include, as a minimum, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), and organochloride pesticides. Any additional contaminant parameters to be tested shall be identified by the Qualified Person based on the historic or present use of the property from which the fill is sourced, any potentially contaminating activities that may have taken place thereon, or known environmental conditions that may impact the quality of the fill.
- ii. The condition of the proposed fill source compared to the appropriate Site Condition Standards established by the Ontario Ministry of the Environment and Climate Change as provided by the Ontario Soil, Ground Water and Sediment Standards for Use under part XV.1 of the Environmental Protection Act dated April 15, 2011 and as may be amended from time to time and in effect at the time the park construction is begun. The Site Condition Standards shall be those applicable to the receiving property (park is Table 3)

as determined based on ground water use, soil texture and land use.

- .6 Submit two copies of soil analysis prepared by a Qualified Person and recommendations for corrections if required, to the Contract Administrator.
 - .7 Fill failing to meet the applicable Site condition standards for the receiving site shall not be imported under any circumstances.
 - .8 Native fill failing to meet the applicable standards, may not be re-used in the park construction.
- .5 Granular Material: to OPSS 1010.

Part 3 Execution

3.1 GENERAL

- .1 All work shall be completed in accordance with the requirements of the Occupational Health and Safety Act, Ontario Regulation 213/91, Construction Projects, 2017, and with documented emergency procedures.

3.2 SITE PREPARATION

- .1 All ice and snow shall be removed from any earth excavation areas under construction.
- .2 Cut pavement or sidewalk where applicable neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 PREPARATION/PROTECTION

- .1 Protect existing features in accordance applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Contract Administrator approval.
- .4 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.
- .5 Protect buried services that are required to remain undisturbed.

3.4 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated after area has been cleared of brush and removed from site.
- .2 Strip topsoil to depths as indicated
 - .1 Do not mix topsoil with subsoil.
- .3 Material meeting the requirements of topsoil according to OPSS 802 shall be stockpiled.
- .4 Dispose of unused topsoil to location as indicated or as directed by Contract Administrator.
- .5 Stripped material that does not meet the requirements of OPSS 802 shall be managed as per the Management of Excavated Material clause.

3.5 STOCKPILING

- .1 Stockpile in locations as indicated

- .1 Stockpile height not to exceed 2 m and should be protected from erosion.
- .2 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 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Contract Administrator's approval details of proposed dewatering or heave prevention methods, where applicable.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

3.7 EXCAVATION

- .1 Advise Contract Administrator at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 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.
- .5 Trenching:
 - .1 The width of the trench at the bottom shall not exceed the width at the top.
 - .2 The Contract Administrator shall be notified immediately if the bottom of the trench appears to give an unsuitable foundation.
 - .3 Trenching shall include the excavation for frost tapers and end sections where applicable.
 - .4 When installing rigid pipe, if the trench is excavated wider than the allowable width without authorization, the Contract Administrator may require the use of a stronger pipe or a higher class of bedding or both.
 - .5 No more than 15 m of trench shall be open in advance of the completed pipe system. Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Contract Administrator.
 - .6 If the trench depth is excavated beyond the limits of the required excavation without the Contract Administrator's authorization, granular material shall be placed and compacted in the trench to reinstate the required trench limits prior to backfilling the trench as specified in the Contract Documents. Alternatively, another structurally accepted design shall be provided by adjusting the limits of the excavation before backfilling
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Unsuitable materials, other than swamp material, shall be removed below the subgrade to the lengths, widths, and depths specified in the Contract Documents. The resulting excavation shall be backfilled with approved material and compacted.
- .8 When boulders are encountered in the excavated slopes, the boulders shall be removed, when directed by the Contract Administrator, and the cavity backfilled with approved material

and compacted.

- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as required to meet geotechnical requirements.
- .11 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .12 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.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Contract Administrator.
- .13 As much of the excavated materials as possible shall be used within the contract limits. Materials that cannot be accommodated as above shall be treated as excess material.
- .14 Obtain Contract Administrator approval of completed excavation.

3.8 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Contract Administrator has inspected and approved installations.
 - .2 Contract Administrator has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Backfill material shall be compatible and free of any contamination, roots or organic material as approved by the Contract Administrator.
- .4 Backfill material shall be placed in uniform layers not exceeding 300 mm in thickness for the full width of the trench and each layer shall be compacted before a subsequent layer is placed to the following parameters:
 - .1 85% Standard Proctor Maximum Dry Density under landscape areas,
 - .2 95% Standard Proctor Maximum Dry Density under pavement areas.
- .5 Stones or rocks larger than 300mm in its greater dimension shall be excluded for use as backfill material and disposed of as surplus material. Frozen material shall not be used as backfill.
- .6 To facilitate future excavation by vacuum equipment, no rock or debris of any kind greater than 150mm in diameter to be within 500mm of any playground, splash pad, sports field, service post or valve box.
- .7 Backfilling around installations:
 - .1 Pipe installation and backfilling shall be completed before the start of subbase and base course construction over the pipe location.
 - .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 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Contract Administrator:
 - .2 If approved by Contract Administrator, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Contract Administrator.
- .8 If in the opinion of the Contract Administrator, the excavated native material is unacceptable as trench backfill material, select backfill material conforming to the F-3147 requirements for select subgrade material shall be imported and used as trench backfill. The unacceptable native material shall be disposed of as surplus material as specified.
- .9 Before allowing the movement of any construction equipment or vehicular traffic over the buried infrastructure, the depth of backfill shall be sufficient enough to protect the buried infrastructure from damage.

3.9 SALVAGE

- .1 All materials designated in the Contract to be salvaged shall, when surplus to the Contract requirements, be delivered to a location within the Town of Marathon or as designated by the Contract Administrator.

3.10 RESTORATION

- .1 Site restoration shall be according to OPSS 492.
- .2 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Contract Administrator.
- .3 Replace topsoil as directed by Contract Administrator.
- .4 Reinstate lawns to elevation which existed before excavation.
- .5 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .6 Clean and reinstate areas affected by Work.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Nursery Landscape Association (CNLA)
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 801, Construction Specification for the Protection of Trees
- .3 International Society of Arboriculture
 - .1 ISA Certification and Credentials
 - .2 Tree Valuation Guidelines for Evaluation of Trees
- .4 American National Standard Institute (ANSI)
 - .1 ANSI A300 (Part 1)-2001, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and re-designation of ANSI A300-1995) (includes supplements).
 - .2 ANSI A300 (Part 2)-1998, Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices - Part 2 - Fertilization.
 - .3 ANSI A300 (Part 3)-2000, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance: Standard Practices - Part 3 - Tree Support Systems (a. Cabling, Bracing, and Guying) (supplement to ANSI A300-1995).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Maintenance Schedules: refer to 2.3.

1.3 CODES AND STANDARDS

- .1 The Contractor shall be familiar with any local by-laws prior to commencing any work around trees. Both by-laws identify guidelines to follow when working around trees.

1.4 QUALITY ASSURANCE

- .1 Contractor shall obtain approval from Town of Marathon prior to working on any Town owned trees.
- .2 Certification: provide International Society of Arboriculture certification.
- .3 Field Samples: where pruning is required, do sample pruning in manner to enable Contract Administrator to identify:
 - .1 Knowledge of target areas including branch bark ridge and branch collars.
 - .2 Technique for selection process and pruning used to establish desired form and shape for each species.
- .4 Acceptance of Work will be determined by Contract Administrator from field sample.
- .5 Any damage to trees due to negligence shall be based on the International Society of Arboriculture Tree Valuation Guidelines for Evaluation of Trees, as evaluated by the contract administrator.
- .6 The contractor shall obtain approval from the Contract Administrator before removing any

tree. If a tree is damaged or removed, the contractor will be required to:

- .1 Pay the cost of repairs and labour for the removal of the tree
- .2 Pay the value of the tree removed. Value of the tree to be determined by the Town of Marathon and calculated using the Trunk Formula Method.
- .3 Pay the cost of a replacement tree and its installation.

Part 2 Execution

2.1 APPLICATION

- .1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

2.2 GENERAL

- .1 The Contractor shall identify plant material and extent of root systems to be preserved to the satisfaction of contract administrator.
- .2 Contractor is to notify the Contract Administrator for the need of Inspection by the Town of Marathon, at least 2 days in advance.
- .3 Protect plant and root systems from damage, compaction, and contamination resulting from construction to the satisfaction of the Contract Administrator.
- .4 Continuous access to the site to be provided to the Inspectors at all times.
- .5 Prune as directed by Contract Administrator. Where discrepancies occur between standard and specifications, specifications govern.
- .6 Retain natural form and shape of plant species.
- .7 To protect trees and shrubs in lawn areas or planting beds that are to remain the contractor erect a snow fence barrier:
 - .1 Standard plastic fencing or approved equivalent in good condition, 1.2 m high, supported vertically by steel T-bars, and horizontally at the top of the fencing by 2" x 4" wood railing, bolted to the steel T-bars. T-bars shall be straight, 1.8 m long.
 - .2 The Contractor shall drive T-bars vertically 600mm into ground, spaced maximum 4.5m apart.
 - .3 The snow fence shall be wired at 3 places to each T-bar and stretched between posts to prevent sag.
- .8 The snow fence shall be erected to provide a continuous barricade between designated trees and the work area prior to construction.
- .9 The snow fence shall be erected at the critical root zone of the trees. The Critical Root Zone (CRZ) of a tree is established as being 10cm from the trunk of a tree for every centimeter of trunk diameter. The trunk diameter is measured at a height of 1.2 metres for trees of 15 cm in diameter and greater, and at a height of 0.3 metres for trees of less than 15 cm in diameter.
 - .1 If the allowable space is inadequate to provide a 1.5 m buffer zone between the fence and limit of construction. With the permission of the contract administrator, the fence may be placed within the CRZ of the tree to provide the required buffer zone of 1.5 m but in no case less than 1 m from the outer circumference to the trunk of the tree.
- .10 Soil compaction within the CRZ of a tree shall be avoided at all times, unless otherwise agreed to in advance by a Town Tree Inspector. Placement of plywood, metal decks, sand,

etc. will be considered prior to authorizing heavy equipment within the unprotected CRZ of all trees in the Work Area.

- .11 Where excavation is required within the CRZ, the subgrade shall be carefully hand excavated, or accomplished by tunneling, boring or hydrovac excavation methods that will protect the roots of the tree.
- .12 Where roots must be pruned, proper arboricultural procedures shall be followed. Guidance for root pruning shall be obtained from the contract administrator. Work shall not proceed without on-site permission of a the contract administrator.
- .13 All root systems shall be exposed and backfilled in one continuous operation wherever possible to minimize desiccation of the root system.
- .14 Wet filter cloth shall be used to temporarily cover and protect the exposed tree roots. Exposed roots shall be kept continuously moist during excavation. Filter cloth shall be installed immediately following root exposure, and shall be held in place with approved pins or spikes until backfilling takes place.
- .15 Trunk protection shall be installed to a height of 2.4 metres or as prescribed by a the contract administrator; wood laths shall be used (2" x 4" or other material as approved by a the contract administrator and shall be temporarily installed parallel to the tree and around the complete circumference of the tree by latching and or wire.
- .16 Equipment shall not be allowed to operate, park, be repaired or refuelled; nor shall construction materials be stored or any earth materials be stockpiled within the fence or within 2 m of the outer edge of the CRZ of a tree.
- .17 Signs, notices or posters shall not be attached to any tree.
- .18 Emissions from equipment shall not be directed in such a way as to come into direct contact with the canopy of a tree.
- .19 Flooding or deposition of sediment shall be prevented where trees are located. Follow the Erosion and Sediment Control plan.
- .20 The existing grade within the CRZ shall not be raised or lowered without the approval of the contract administrator.
- .21 Barricades shall be maintained at all times during construction operations, and shall be removed upon completion when agreed to by the contract administrator. Temporary removal of barricades will be considered only after reviewing the requirements with the contract administrator

2.3 MAINTENANCE DURING CONSTRUCTION

- .1 During the period between May 15 and September 15 of each year, watering of all plants exposed to stresses from construction shall be carried out no less than 3 times weekly, in accordance with a watering schedule submitted to the contract administrator for review each week during this period.
- .2 The planting saucer of each tree shall be filled with water and the water allowed to percolate into the soil before being re-filled as many times as necessary to meet the volume requirements of Table 1. Area shall be uniformly soaked to a depth of 300 mm using a soft spray nozzle to avoid packing of soil and damage to vegetation.

Water Application Rates for Trees	
Tree Caliper	Litres per Watering
50mm	150L
60mm	160L
70-80mm	170L

Mature Trees	550L
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2.4 CLEAN-UP

- .1 For the disposal of infested or diseased material, refer to:
 - .1 Canadian Food Inspection Agency document D-12-03: Domestic Requirements for Potentially Injurious Organisms (other than plants) to Prevent the Spread of Plant Pests Within Canada
 - .2 The Canadian Food Inspection Agency for a list of authorized disposal facilities under the Containment Standards for Facilities Handling Plant Pests, with the relevant addenda.
- .2 Divert inert wood materials from landfill to compost facility, if available, as directed by Contract Administrator.
- .3 Inert wood and wood products may also be disposed of on-site under special circumstances and with the written approval of the contract administrator.
- .4 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .5 Waste or volatile materials, such as mineral spirits, oil or paint thinner shall not be disposed of within the CRZ of a tree, but disposed of at the appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for asphalt pavement for car park areas, driveways to buildings, walks and aprons

1.2 RELATED SECTIONS

- .1 Section 31 00 00.01 – Earthwork and Related Work

1.3 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS). All OPSS references shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial oriented specification is specified in the Contract Documents.
 - .1 OPSS 310 Nov 2017 - Construction Specification for Hot Mix Asphalt.
 - .2 OPSS 501 Nov 2017 – Construction Specification for Compacting
 - .3 OPSS 1010 Nov 2013 - Material Specification for Aggregates-Base, Subbase, Select Subgrade, and Backfill Material.
 - .4 OPSS 1103 Nov 2019 - Material Specification for Emulsified Asphalt.
 - .5 OPSS 1150 Nov 2018 - Material Specification for Hot Mix Asphalt
 - .6 OPSS 1151 Apr 2018 – Material Specification for SuperPave and Stone Mastic Asphalt Mixtures.

1.4 DEFINITIONS

- .1 Segregation: means a condition of the pavement characterized by areas with comparatively coarser or finer texture than that of the surrounding pavement.

1.5 QUALITY ASSURANCE

- .1 Asphalt will be visually inspected by the consultant for the presence of segregation. Segregation shall be as per OPSS 310.07

1.6 SUBMITTALS

- .1 Submit asphalt mix design to Consultant 10 business days prior to paving in accordance to OPSS 1151.

1.7 MEASUREMENT

- .1 Measurement of Superpave 12.5 Hot Mix shall be by area in square metres.
- .2 Measurement of Granular A, Granular B Type I shall be by mass in tonnes.

1.8 UNIT RATES

- .1 Provide unit rates as requested in tender form.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Aggregates in accordance to OPSS 1010.
 - .1 Granular A
 - .2 Granular B Type I
- .2 Tack coat: SS-1 in accordance to OPSS 1103.
- .3 Asphaltic Concrete and Aggregates in accordance to OPSS 1151 and OPSS 310.
- .4 Paint:
 - .1 To CGSB1-GP-74M, alkyd traffic paint.
 - .2 Colour: to CGSB1-GP-12C, white 513-301, yellow 505-308.
- .5 Thinner: to CAN/CGSB-1.5.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION AND INSPECTION

- .1 Do subgrade preparation work in accordance with Section 31 00 00.01 - Earthwork and Related Work
- .2 Verify grades of subgrade, drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.
- .3 Obtain approval of subgrade by Consultant before placing granular sub-base and base.

3.2 GRANULAR SUB-BASE AND GRANULAR BASE

- .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
- .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.
- .3 Place in layers not exceeding 300 mm compacted thickness. Compact to OPSS 501.
- .4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

3.3 PAVEMENT STRUCTURE

- .1 Minimum Pavement Structure (Heavy Duty Parking and Access Road):
 - .1 300mm Granular B Type I
 - .2 150mm Granular A
 - .3 40mm Binder SuperPave 12.5 (PGAC 52-34)
 - .4 50mm Surface SuperPave 12.5 (PGAC 52-34)

- .2 Minimum Pavement Structure (Light Duty Parking):
 - .1 300mm Granular B Type I
 - .2 150mm Granular A
 - .3 50mm Binder SuperPave 12.5 (PGAC 52-34)

3.4 PAVEMENT CONSTRUCTION

- .1 Construction of asphalt concrete in accordance to OPSS 310.
- .2 Equipment shall be in accordance with OPSS 310.06
- .3 Prior to placing any course of hot mix asphalt on a granular grade, a class S roller of a minimum 7 tonnes or an equivalent class V roller with a drum width of at least 1.2 metres shall be used to finish roll the grade ahead of the paver to ensure a compacted, smooth and float-free surface. Any distortion that will impact the specified thickness of the pavement to be placed shall be repaired.
- .4 The temperature of the hot mix asphalt prior to placement shall be within the temperature range that corresponds to the PGAC manufacturer's recommended mix temperature. The mix temperature of the hot mix asphalt immediately after spreading and prior to initial rolling shall not be less than 120°C.
- .5 Placing of hot mix asphalt in accordance with OPSS 310.07.06.02.
- .6 Use of paving equipment in accordance with OPSS 310.07.07.
- .7 Longitudinal and traverse joints in accordance with OPSS 310.07.11.
- .8 Compaction in accordance with OPSS 310.07.12.
- .9 Each course after final compaction shall be of uniform texture and shall be free of defects such as segregation, fat spots, oil spills and roller marks. Defective areas shall be removed and replaced with asphalt of the same type and compacted at no cost to the Owner and to the satisfaction of the Consultant,

3.5 PAVEMENT MARKINGS

- .1 Paint applicator to be an approved pressure type distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- .2 Pavement markings to be laid out as indicated by the Contractor.
- .3 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.
- .4 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10°C, wind speed is less than 40 km/h and no rain is forecast within next 4 h.
- .5 Apply traffic paint evenly at rate of 3 m²/L.
- .6 Do not thin paint unless approved by Consultant.
- .7 Symbols and letters to conform to dimensions indicated.

- .8 Paint lines to be of uniform colour and density with sharp edges.
- .9 Thoroughly clean distributor tank before refilling with paint of different colour.

3.6 QUALITY CONTROL

- .1 The Proponent shall retain the services of a consulting firm with CCIL Certified Lab Type-C designation for Quality Control testing of materials and compaction of aggregates and Hot Mix.
- .2 Quality Assurance test results shall be used for the acceptance of asphalt and aggregates, except when referee testing has been carried out. Quality Control sampling and testing shall be in accordance with OPSS 1010, OPSS 310 & OPSS 1151.
- .3 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-88, Sieves, Testing, Woven Wire, Metric.
 - .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1010, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material
 - .3 Town of Marathon Standard Specifications
 - .1 Town of Marathon SP F-3147, Granular Material
 - .4 ASTM International
 - .1 ASTM C117-13, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM D4318-10e1, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - .3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
- 1.2 DELIVERY, STORAGE AND HANDLING**
- .1 Store crushed stone as and where directed by contract administrator.
 - .2 All ice and snow shall be removed from all portions of the Work Area. Frozen material shall not be incorporated into the Work. Material shall not be placed over frozen ground.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: Granular 'A' in accordance with Town of Marathon F-3147 and following requirements:
 - .1 Crushed stone or gravel: hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 - .2 Liquid limit: ASTM D4318 maximum 25.
 - .3 Plasticity index: ASTM D4318 maximum 6.
- .2 Granular topping:
 - .1 Screenings: hard, durable, crushed stone particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.4 Gradations:

.5

.6	Particle size	.7	% Passing
.8	4.76mm	.9	100%
.10	2.38mm	.11	80%
.12	1.19mm	.13	60%
.14	0.595mm	.15	45%
.16	0.075mm	.17	10%

.18

.1 Geotextile filter fabric: approved non-woven class 1 geotextile.

Part 3 Execution

3.1 SUBGRADE

.1 Ensure subgrade preparation conforms to levels and compacted to 98% Standard Proctor Maximum Dry Density, to allow for installation of granular base.

3.2 GEOTEXTILE FILTER

.1 Install geotextile filter if required resulting from geotechnical tests on subgrade below pathway. Install as per contract drawings.

3.3 GRANULAR BASE

- .1 Granular base material thickness: as indicated on Contract Drawings, if applicable.
- .2 Aggregates derived from slag are not permitted.
- .3 Spread and compact granular base material in uniform layers not exceeding 150 mm compacted thickness.
- .4 Compact to a density of not less than 98% Standard Proctor Maximum Dry Density.

3.4 GRANULAR TOPPING

- .1 Place granular topping to compacted thickness of 100mm minimum.
- .2 Place material in uniform layers not to exceed 50 mm compacted thickness.
 - .1 Compact layer to 100 % Standard Proctor Maximum Dry Density.
- .3 The finished granular courses shall not deviate more than 30mm from the specified grade and cross-section and the surface shall not deviate more than 15mm at any place as measured in any direction with a 3m straight edge.

3.5 FIELD QUALITY CONTROL

- .1 Inspection and testing of crushed stone paving: compaction testing carried out by designated testing laboratory.
- .2 Costs of tests to be included in Tender price.

3.6 CLEANING

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

3.7 PROTECTION

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property.
 - .1 Repair damages incurred.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- .1 Materials and installation for concrete walks, curbs, gutters, spillways identified on the civil drawings.

1.2 RELATED SECTIONS

- .1 31 00 00.01 – Earthwork and Related Work

1.3 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS). All OPSS references shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial oriented specification is specified in the Contract Documents.
- .2 Ontario Provincial Standard Specification (OPSS)
 - .1 OPSS 351 Nov 2019 – Construction Specification for Concrete Sidewalk
 - .2 OPSS 353 Nov 2019 – Construction Specification for Concrete Curb and Gutter Systems
 - .3 OPSS 501 Nov 2017 – Construction Specification for Compacting
 - .4 OPSS 1010 Nov 2013 – Material Specification for Aggregates-Base, Subbase, Select Subgrade, and Backfill Material.
 - .5 OPSS 1308 Nov 2019 – Material Specification for Joint Filler in Concrete.
 - .6 OPSS 1315 Nov 2008 – Material Specification for White Pigmented Curing Compounds for Concrete.
 - .7 OPSS 1350 Nov 2019 - Material Specification for Concrete – Materials and Production.
 - .8 OPSS.PROV 1350 Nov 2019 - Material Specification for Concrete – Materials and Production.

1.4 SUBMITTALS

- .1 Performance based concrete mix data in accordance to OPSS 1350.
- .2 Product Data: submit WHMIS MSDS.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Not Applicable.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Concrete mixes and materials in accordance to OPSS 1350.

- .2 Joint filler material shall be asphalt impregnated fibreboard having a minimum of 12 mm thickness and shall be according to OPSS 1308, Type A.
- .3 Hot rubberized asphalt joint sealing compound in accordance to OPSS 1212.
- .4 Curing Compound in accordance to OPSS 1315.
- .5 Granular base and fill material in accordance to OPSS 1010.
- .6 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.
- .7 Steel Reinforcement:
 - .1 Welded Wire Mesh: to ASTM A185/A185M
 - .2 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .8 Tactile Walking Surfaces: Gray cast iron tactile walking surface indicator plates shall be as specified in the Contract Documents. Castings shall be according to ASTM A 48M, Class 35B, and shall be bare and not coated with paint or other coatings or substances. Castings shall be sound, free from pouring faults, cracks, blowholes, and other defects. The surface of each new cast iron plate on both the tops of the truncated domes and the field between the truncated domes shall have a minimum wet and dry static coefficient of friction of 0.8 according to ASTM C 1028. The initials or trademark of the manufacturer, year of manufacture, and country of manufacture shall be distinctly cast and legible in raised letters on the top side of each plate.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION AND INSPECTION

- .1 Subgrade preparation work in accordance with Section 31 00 00.01 - Earthwork and Related Work
- .2 Obtain approval of subgrade by Consultant before placing granular base.

3.2 GRANULAR BASE

- .1 Obtain Consultant'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 150 mm layers and compact to OPSS 501. Compact Granular to 98% SPMDD.

3.3 CONCRETE

- .1 Obtain Consultant's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Provide 24 hours advance notice to Consultant prior to placing concrete.
- .3 Concrete placement, joints, finishing and curing for concrete sidewalks in accordance to OPSS 351 and thicknesses indicated.

- .4 Concrete placement, joints, finishing and curing for concrete curb, gutters and spillways and gutter outlets in accordance to OPSS 353 and thicknesses indicated.

- .5 Terminate concrete curb over a minimum distance of 1.5 m to preferred 3.0 m.

3.4 TOLERANCES

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

3.5 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as indicated.
 - .1 Compact to OPSS 501 and shape to required contours as indicated. Compact granular material to 98% SPMDD.

3.6 CLEANING

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

3.7 QUALITY CONTROL

- .1 The Proponent shall retain the services of a consulting firm with CCIL Certified Lab Type-C designation for Quality Control testing of materials and compaction of backfill.
- .2 Quality Control test results shall be used for the acceptance of aggregates, except when referee testing has been carried out. Quality Control sampling and testing shall be in accordance with OPSS 1010. The Consultant will randomly select when samples are to be collected.
- .3 Concrete Quality Control Testing in accordance to OPSS.PROV 1350 November 2019
- .4 Not later than 48 hours before backfilling or filling with approved material, notify Consultant.
- .5 Contractor to conduct Quality Control (QC) density testing to ensure granular materials are compacted according to the requirements.
- .6 Contractor shall submit QC density test records to Contract Administrator and owner using the field compaction report provided in OPSS 501 Appendix B or other approved form.
- .7 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB1-GP-12c-68, Standard Paint Colours.
 - .2 CGSB1-GP-71-83, Method, of Testing Paints and Pigments.
 - .3 CGSB1-GP-74M-79, Paint, Traffic, Alkyd.

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 two copies 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 CGSB1-GP-74M, alkyd traffic paint.
 - .2 Colour: to CGSB1-GP-12C;
 - .1 White 513-301:
 - .2 Yellow, as approved by Contract Administrator.
 - .3 Blue, as approved by Contract Administrator.
 - .3 Size: 50mm (unless noted otherwise)
- .2 Thinner: to CAN/CGSB-1.5.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
 - .1 Visually inspect substrate in presence of Consultant.
- .2 Asphalt/ Unit Paver surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator: approved pressure type mobile 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 APPLICATION

- .1 Lay out pavement markings.
- .2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m²/L.
- .4 Do not thin paint unless approved by Consultant.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.

3.4 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings via method approved by Consultant.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION OF COMPLETED WORK

- .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 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-88, Sieves, Testing, Woven Wire, Metric.
- .2 Ontario Provincial Standard Specifications
 - .1 OPSS 1004, Material Specification for Aggregates – Miscellaneous
 - .2 OPSS 1010, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material
- .3 CAN/CSA / ASTM International
 - .1 ASTM C117-13, Standard Test Method for Material Finer Than 0.075mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM D4318-10e1, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - .3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
 - .4 CAN/CSA-Z614-14 / ASTM F1292-99, Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment including HIC, G-MAX and fall heights.
 - .5 ASTM F2075-15, Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment
 - .6 ASTM F1951, Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data: Submit manufacturer's instructions, printed product literature and data sheets for all equipment and include product characteristics, performance criteria, physical size, finish and limitations. Include a physical sample of the product.
- .2 Inspection reports:
 - .1 Subgrade and granular subbases and bases to be inspected by geotechnical Engineer and an Inspection Report issued to and approved by the Contract Administrator, before subsequent steps are undertaken.
 - .2 Cost of inspections to be included in the tender price.
- .3 The Contract Administrator may require additional field and/or laboratory tests of the materials during installation to ensure that the materials are satisfactory. This shall be carried out at no extra cost to the contract.

- .4 Certificates of laboratory testing to ASTM F1292, ASTM F2075 and ASTM F1951 as part of the qualification of the wood fibre.
- .5 Subgrade and granular bases to be inspected by a geotechnical Engineer and an Inspection Report issued to the Contract Administrator, before subsequent steps are undertaken.
 - .1 Cost of inspections to be included in the tender price.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Store clear stone where directed by Contract Administrator to prevent contamination of material.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: in accordance with OPSS 1010.
- .2 Edging: as indicated on contract drawings.
- .3 Geotextile filter: Approved non-woven Class 1 Geotextile
- .4 Clear Stone: 19mm to OPSS 1004.
- .5 Contractor to include rodent guard at all drain outlets. Outlets shall be cut and discharge with the drain flow direction.
- .6 Engineered Wood Fibre:
 - .1 The materials shall consist clean engineered material. Standard wood chips are not acceptable.
 - .2 Materials must meet or exceed ASTM F1292-13, and ASTM F2075-15 for impact attenuation.
 - .3 Materials must comply with ASTM F1951.
 - .4 Materials must provide a minimum 5-year warranty against loss of resiliency.
 - .5 Free from subsoil, roots, vegetation debris, toxic materials and stones.
 - .6 Accepted products:
 - .1 Fiberweave as supplied by Fibertop, 905-203-0816.
 - .2 Cedarweave as supplied by Playground Planners 1-613-828-5502 or approved equal.

Part 3 Execution

3.1 LAYOUT AND EXCAVATION

- .1 Subgrade, granular subbases, and bases to be inspected by a geotechnical engineer and authorization given by the Contract Administrator prior to subsequent steps being undertaken.
- .2 Stake out the play area perimeter and the location, and alignment of all drain tiles for inspection by the Contract Administrator. Ensure required safety zones are maintained.

- .3 Verify all underground utilities and dimensions in the field and immediately report all discrepancies or findings to the Contract Administrator.
- .4 Excavate to Section 31 23 33.01 – Excavating Trenching and Backfilling.
- .5 Do not disturb soil within Critical Root Zone of trees and shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .6 Play area to be excavated to accommodate a minimum of 450 mm of safety surface/clear stone (unless otherwise indicated).

3.2 SUBGRADE

- .1 Fine grade sub-grade of play area eliminating uneven areas and filling lowspots and sloping to ensure positive drainage to the drain tile trenches. Remove all debris. Sub-excavate soft and unstable areas in sub-grade and backfill with approved fill and compact.
- .2 Compact finished sub-grade to 95% Standard Proctor Maximum Dry Density.
- .3 Ensure subgrade preparation conforms to levels and compaction required, to allow for installation of granular base. Testing in accordance with Section 31 23 33.01, Excavating, Trenching and Backfilling.

3.3 GRANULAR BASE

- .1 Granular base material thickness: as indicated on the Contract Drawings.
- .2 Spread and compact granular base material in uniform layers not exceeding 50 mm thickness, compacted to 95% Standard Proctor Maximum Dry Density.

3.4 GEOTEXTILE FILTER

- .1 Install geotextile filter as indicated on the Contract Drawings.
- .2 Cut and fit filter fabric around playground structures footing and overlap seams by 300mm. Tack filter fabric to asphalt edge with adhesive (PL Premium or approved equal).
- .3 Install filter fabric over the drainage aggregate. Install aggregate base to 150mm minimum depth.
- .4 Top elevation of drainage layer shall be true and level.

3.5 ENGINEERED WOOD FIBRE

- .1 Spread play engineered wood fibre only after inspections have been reviewed, the requirements in Section 11 60 00, Athletic and Play Equipment have been met, and the Contract Administrator gives authorization.
 - .1 Install engineered wood fiber surface in 150mm compacted lifts to a 300mm minimum depth after compaction to meet ASTM F1951.
 - .2 Rake, level and wet the surface before compacting with a mechanical vibratory compactor after each layer installed.
 - .3 Change direction 90 degrees between each layer. Repeat these steps until the minimum 300mm compacted depth has been reached.
 - .4 Remove all foreign material.
 - .5 Rake to keep surface level and the thickness to 300mm minimum depth.
 - .6 Contractor shall confirm engineered wood fibre meets or exceeds current Annex H and ASTM F1951.

.7 Ensure adequate moisture content in product so as, to not allow airborne wood fibres to become an issue to neighbouring lands.

3.6 FIELD QUALITY CONTROL

- .1 Inspection and testing of Playground Surfacing: carried out by Playground Inspector approved by the Contract Administrator.
- .2 Contractor to top up/amend surfacing found inadequate by inspector.
- .3 Costs of tests: paid by Contractor.
- .4 The Contractor shall have a certified playground inspector inspect the completed playground before the playground installer leaves the site.
- .5 Inspection report to include; general site information, surfacing information (min. 3 test pits, etc.), general equipment information, hazard and compliance rating, Annex H compliance analysis, qualifications / certificates, proof of insurance. Report to be reviewed by Contract Administrator and meet standard practices.

3.7 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Clean up areas where engineered wood fibre has been spilled outside of play areas.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

- .1 Protect surface from contamination until completion of the project.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-88, Sieves, Testing, Woven Wire, Metric.
- .3 Ontario Provincial Standard Specifications
 - .1 OPSS 1010, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material
- .4 Town of Marathon Standard Specification
 - .1 F-3147, Granular Material.
- .5 ASTM International
 - .1 ASTM C117-13, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM D4318-10e1, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - .3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Samples:
 - .1 Submit samples of sand.
- .2 Sand testing:
 - .1 Submit Sieve Analysis/Grain Size Distribution Test data for Play Sand to be installed from authorized testing agency.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials to avoid contamination.

Part 2 Products

2.1 MATERIALS

- .1 Granular 'A': To OPSS 1010, Granular material. Aggregates from slag are not permitted.

- .2 Play sand:
 - .1 Supply and install material with a grain size distribution chart, to be pre-authorized by the Contract Administrator, should compactible, mouldable sand be requested.

Part 3 Execution

3.1 LAYOUT AND EXCAVATION

- .1 Stake out the sand play area perimeter and the location, and alignment of all drain tiles for inspection by the Contract Administrator. Ensure required safety zones are maintained where applicable.
- .2 Verify all underground utilities and dimensions in the field and immediately report all discrepancies or findings to the Contract Administrator.
- .3 Excavate to Section 31 23 33 01 – Excavating Trenching and Backfilling.
- .4 Do not disturb soil within spread of trees and shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 Sand Play area to be excavated to accommodate a minimum of 300mm of Sand and 200mm clear stone from finished grade to top subgrade as per detail.

3.3 Placing

- .1 Place sand material to line and grade shown on drawings.
- .2 Take care not to contaminate sand layer with granular, topsoil or other fill materials.

3.4 CLEANING

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

3.5 PROTECTION

- .1 Protect Sand Play Area from contamination until completion of the project.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 CAN/CGSB-8.2-88, Sieves, Testing, Woven Wire, Metric
 - .2 Submit manufacturer's instructions, printed product literature and data sheets for furniture and include product characteristics, colour options, performance criteria, physical size, finish and limitations.
 - .3 Submit type and number of fasteners to be used for all installation for approval by Contract Administrator.
- .2 Shop Drawings:
 - .1 Submit shop drawings indicating dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.

1.2 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data for care and cleaning of site furnishings for incorporation into manual.

1.3 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 GENERAL

- .1 All materials listed here may be substituted with an approved equal, with prior approval by the Contract Administrator.

2.2 PICNIC TABLE

- .1 Acceptable material: Picnic Table, Model # EP 2630, Polyester Powder Coat Frame, theftproof bolts – as supplied by Equiparc @ www.equiparc.com 1(800) 363-9264 or approved Equivalent.
 - .1 Colour: To be selected by the Contract Administrator. Colour options to be provided for approval.
 - .2 Covering: ipe
 - .3 Footing: surface mount on concrete pad

2.3 ACCESSIBLE PICNIC TABLE

- .1 Acceptable material: Picnic Table, Model # EP 2630 HAND, Polyester Powder Coat Frame, theftproof bolts – as supplied by Equiparc @ www.equiparc.com 1(800) 363-9264 or

approved Equivalent.

- .1 Colour: To be selected by the Contract Administrator. Colour options to be provided for approval.
- .2 Covering: ipe
- .3 Footing: surface mount on concrete pad

2.4 SQUARE PICNIC TABLE

- .1 Acceptable material: Picnic Table, Model # EP 2886, Polyester Powder Coat Frame, theftproof bolts– as supplied by Equiparc @ www.equiparc.com 1(800) 363-9264 or approved Equivalent.
 - .1 Colour: To be selected by the Contract Administrator. Colour options to be provided for approval.
 - .2 Covering: ipe
 - .3 Footing: surface mount on concrete pad

2.5 ACCESSIBLE SQUARE PICNIC TABLE

- .1 Acceptable material: Picnic Table, Model # EP 2886 HAND-RS GP, Polyester Powder Coat Frame, theftproof bolts– as supplied by Equiparc @ www.equiparc.com 1(800) 363-9264 or approved Equivalent.
 - .1 Colour: To be selected by the Contract Administrator. Colour options to be provided for approval.
 - .2 Covering: ipe
 - .3 Footing: surface mount on concrete pad

2.6 WASTE RECEPTACLE

- .1 Acceptable material: Mini Hid-a-Bag II, Model # SP-HBIIA-P, accessible side-hinge user door. – as supplied by Haul-All Equipment Systems @ www.haulall.com 1(888) 428-5255 or approved Equivalent.
 - .1 Colours: To be selected by the Contract Administrator. Colour options to be provided for approval.
 - .2 Footing: surface mount on concrete pad

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for exterior site furnishing installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Contract administrator 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 Contract administrator.

3.2 PREPARATION

- .1 Locate and protect utility lines.
- .2 Notify and acquire written acknowledgment from utility authorities before beginning

installation Work

3.3 INSTALLATION

- .1 Assemble furnishings in accordance with manufacturer's written recommendations.
- .2 Install furnishing true, plumb, anchored as indicated.
- .3 Use vandal proof nuts as per manufacturer specifications.
- .4 Touch-up damaged finishes to approval of Contract administrator.

3.4 CLEANING

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

3.5 PROTECTION

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

3.6 GUARANTEE

- .1 All items to carry a minimum 5-year warranty against rusting, flaking or chipping and to be guaranteed in accordance to the manufacturer's warranty for all play equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment (CCME)
 - .1 PN1340-2005, Guidelines for Compost Quality.
 - .2 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, 2009.
- .3 Athletic Field Construction Manual, Sports Turf Association, Second edition.
- .4 Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), 2012 Sampling and Analysis Protocol for Ontario Regulation 267/03, under the Nutrient Management Act, 2002.
- .5 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 802, Construction Specification for Topsoil

1.2 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25), and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category A.
- .2 Qualified Person is defined as a Professional Engineer or Geoscientist, as specified by Ontario Regulation 153/04 Records of Site Condition – Part XV.1 of the Environmental Protection Act.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Quality control submittals for Topsoil:
 - .1 The Contractor is to have the source for the topsoil approved by the Contract Administrator. As part of the approval process, the Contractor shall provide written documentation demonstrating that the Contractor has fulfilled the following requirements:
 - .1 A minimum of three representative soil samples of every proposed source of imported topsoil shall be collected by or under the supervision of a Qualified Person.
 - .2 A minimum of three representative soil samples of native soils to be re-used on site are also required to be tested.
 - .3 The collection of soil samples to be in accordance with the OMAFRA Field Quality Control methods outlined in the 2012 Sampling and Analysis Protocol for Ontario Regulation 267/03 Made under the Nutrient Management Act, 2002.

- .4 Mix samples together thoroughly before submitting for testing.
- .5 Soil samples are to be tested by an accredited analytical laboratory designated by the Contract Administrator. The contractor is responsible for the cost of this testing. Testing is to be done to the following parameters:
 - i. Concentration of contaminants: Typical contaminants parameters shall include, as a minimum, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), and organochloride pesticides. Any additional contaminant parameters to be tested shall be identified by the Qualified Person based on the historic or present use of the property from which the topsoil is sourced, any potentially contaminating activities that may have taken place thereon, or known environmental conditions that may impact the quality of the topsoil.
 - ii. The condition of the proposed topsoil source compared to the appropriate Site Condition Standards established by the Ontario Ministry of the Environment and Climate Change as provided by the Ontario Soil, Ground Water and Sediment Standards for Use under part XV.1 of the Environmental Protection Act dated April 15, 2011 and as may be amended from time to time and in effect at the time the park construction is begun. The Site Condition Standards shall be those applicable to the receiving property (park is Table 3) as determined based on ground water use, soil texture and land use.
 - iii. Soil structure and composition: clay, sand and silt content through particle size distribution, Saturated hydraulic conductivity, bulk density, actual CEC, organic matter percentage, concentration of N, P, K, Mg, soluble salt content, pH value, growth inhibitors and soil sterilants, to meet OPSS 802, Construction Specification for Topsoil.
 - iv. For sportsfields, the results of the physical parameter testing shall be compared to the Field Category 3 physical parameters as listed in Sport Turf Canada's Athletic Field Construction Manual, Second Edition, Table 2.2.6 regarding sand/silt/clay content.
- .6 Submit two copies of soil analysis prepared by a Qualified Person and recommendations for corrections if required, to the Contract Administrator.
- .7 Topsoil failing to meet the applicable Site condition standards for the receiving site shall not be imported under any circumstances.
- .8 Native topsoil failing to meet the applicable standards, may not be re-used in the park construction.
- .9 The Testing Agency may make suitability recommendations to the Contract Administrator based on the physical analyses of composite samples ideally possessing organic matter content greater than five percent (5%), a bulk density less than 1.4 g/cm³ and a saturated hydraulic conductivity no less than 50 mm/hour. Pre-plant amendment recommendations may also be made by the Testing Agency based on chemical testing. All recommendations will be submitted to the Contract Administrator prior to hauling and spreading topsoil on the work site, and only implemented at the discretion of the Contract Administrator.

- .1 Pre-installation meetings: conduct pre-installation meeting to verify topsoil testing results project requirements, installation instructions and warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused soil amendments from landfill to official hazardous material collections site.
- .2 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

- .1 All topsoil for Park use must meet the requirements and contain the characteristics as indicated in OPSS 802, Construction Specification for Topsoil.
- .2 Final acidity value shall range from pH 6.0 to pH 7.5 for turfgrass, trees and shrubs and shall be capable of sustaining vigorous plant growth, to the satisfaction of the Contract Administrator.
- .3 Water infiltration shall be no less than 50mm/hr and not greater than 200mm per hour.
- .4 No stones or clods greater than 13mm.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
- .2 Peat moss:
 - .1 Derived from partially decomposed species of 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: 5 mm.
- .3 Sand: washed coarse silica sand, medium to course textured.
- .4 Organic matter: compost Category A in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements at 4-6% by weight.
- .5 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas after grubbing has been completed and material removed from site.
- .2 Strip topsoil to depths as directed by Contract Administrator.
 - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Stockpile in locations as indicated.
 - .1 Stockpile height not to exceed 2m.
- .4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill, as directed by Contract Administrator.
- .5 Protect stockpiles from contamination and compaction.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Contract Administrator and do not commence work until instructed.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 13mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 The area should be sufficiently free of debris to ensure topsoil depth is consistent across all areas of the field to the minimum depth as required in the contract.
 - .3 Dispose of removed material off site. Dispose contamination in responsible manner at the appropriate facility.
- .4 Cultivate general landscape area which is to receive topsoil to the minimum depth of 25 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Contract Administrator has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 50mm to a minimum of 150mm.
- .3 For sodded areas keep topsoil 15mm below finished grade.
- .4 Spread topsoil to minimum depths as indicated on contract drawings.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

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 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

- .1 Once all topsoil is installed on the site, the Contract Administrator shall:
 - .1 Confirm topsoil depths using a soil probe.
 - .2 Visually inspect the grades, surface quality and condition of the soils.
 - .3 Collect a minimum of 4 topsoil samples from throughout the site.
 - .1 The topsoil samples from the park may be mixed together to form a 'representative sample'.
 - .2 The Contract Administrator shall submit each sample to the same accredited analytical laboratory, to test for structure (clay, sand and silt), N, P, K, Mg, soluble salt content, pH value.
 - .3 Conditions for acceptance include the following:
 - i. The soils must meet the requirements of OPSS 802, Construction Specification for Topsoil and the parameters identified in this specification. Failure to meet the requirements will result in rejection of the product.
 - ii. The soils must not deviate more than 10% from the source testing results. Deviations greater than 10% will result in a need for further contaminant testing.
- .2 Where proper testing, review and acceptance has not been provided the contractor may be required to perform additional testing to prove the soil conditions meet these specifications and if unsuccessful may be required to remove and replace with an acceptable topsoil to the depth or quantities directed by the contract administrator.

3.6 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required off site.

3.7 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 802, Construction Specification for Topsoil
 - .2 OPSS 804, Construction Specification for Seed and Cover

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, and fertilizer.
 - .2 Submit 1 copies of WHMIS MSDS.
 - .3 Submit a Certificate of Seed Analysis that stipulates the seed supplier's lot designation numbers.
 - .1 Test results from the Certificate of Seed Analysis shall specify germination and purity for each seed species of the mix as well as the seed mix composition expressed as a percentage of each seed species by mass for each seed mix specified in the Contract Documents.
- .2 Samples:
 - .1 Submit 0.5 kg container of each type of fertilizer used.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 OPERATIONAL CONSTRAINTS

- .1 This specification does not cover the establishment of turf for sportsfields.
- .2 Mechanical seeding, using a Brillion seeder or equivalent is the preferred method for all park seeding. All other methods shall only be considered in areas where mechanical seeding is not possible, and must be authorized as a seeding method by the contract administrator.
- .3 Seeding and mulching operations shall only be carried within the following periods, where soil humidity allows germination and growth:
 - .1 Spring period: May 1st to June 15
 - .2 Fall period: August 15 to October 31

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 All seed and seed mixes shall be in the original factory sealed package with the original legible label securely attached. Labelling shall be according to the

requirements of the Canada Seeds Act and Regulations. Each package shall be labelled to show:

- .1 The name and address of the seed supplier,
 - .2 The name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass of each,
 - .3 The grade of the seed or seed mix,
 - .4 The supplier's lot designation number corresponding to the Certificate of Seed Analysis,
 - .5 Mass in kilograms of the seed mix,
 - .6 The inoculant type, strain, and expiry date.
- .2 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, year of production, date of bagging, supplier's name and lot number.
- .3 Fertilizer must be dry.
- .2 Storage and Handling Requirements:
- .1 All seed and inoculant shall be stored in cool, dry locations until use. Inoculant is only required for seed mixes containing Crown Vetch or Birdsfoot Trefoil.
 - .2 Store fertilizer in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .3 Replace defective or damaged materials with new.
 - .4 No seed or cover shall come in contact with the foliage of any trees, shrubs, or other vegetation, except as specified in the Seeding subsection. No seed or cover shall come in contact with waterbodies

Part 2 Products

2.1 MULCH, COVER & MEDIUM

- .1 **Hydraulic Mulch:** Hydraulic mulch shall be capable of dispersing rapidly in water to form a homogeneous slurry and remain in such a state when agitated or mixed with other specified materials. When applied, hydraulic mulch shall be capable of forming a uniform, cohesive mat. Hydraulic mulch shall not inhibit growth or germination of the seed mix. Hydraulic mulch shall be dry, free of weeds and other foreign materials, and shall be supplied in factory sealed packages bearing the manufacturer's label indicating product name and mass.
- .2 **Bonded Fibre Matrix:** Bonded Fibre Matrix (BFM) shall be a hydraulically applied, 100% biodegradable product, which after application is capable of adhering to the soil. In a dry state, BFM shall be comprised of not less than 70% by weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The hydrated BFM shall form a viscous material that creates a high strength, porous, and erosion-resistant uniform, cohesive mat, when applied and dried. The bonding agent shall not dissolve or disperse upon re-wetting. BFM shall not inhibit the germination or growth of plant material.
- .3 **Erosion Control Blanket (ECB):** Erosion control blanket (ECB) shall be of a consistent thickness with a 100% biodegradable even fibre distribution. The ECB shall be covered on

top with a biodegradable and photodegradable plastic mesh. ECB may also be sewn together with cotton thread. ECB shall be supplied in a dry, rolled mat protected with an outer waterproof wrap bearing the manufacturer's original label indicating product name and application instructions. Staples shall be U-shaped, constructed of wire with a diameter of at least 2.5 mm with legs at least 150 mm long and 25 mm apart

.4 For terra-seeding, growing medium shall be pre-mixed and consist of a minimum 60% compost material. The growing medium may be amended by the additional of sand and peat loam. Both amendments shall be added at the discretion of the Contractor to ensure that the growing medium meets the material specification and is suited for distribution by a pneumatic blower.

.5 Compost and Sand to Section 32 91 19.13, Topsoil Placement and Grading.

2.2 GRASS SEED

.1 General Purpose:

.1 Alternative varieties must be scientifically demonstrated for salt tolerance and cold hardiness equal or greater than the varieties specified above. This information shall be submitted in writing from the seed producer on the Contract Administrator for review prior to the start of seeding operations.

.2 Nurse Crop: Nurse crop will be Annual Ryegrass at a rate of 0.5kg per 100m², unless otherwise approved by the Contract Administrator.

.3 Alternative varieties must be scientifically demonstrated for salt tolerance and cold hardiness equal or greater than the varieties specified above. This information shall be submitted in writing from the seed producer on the Contract Administrator for review prior to the start of seeding operations.

.2 Nurse Crop: Nurse crop seed shall be either Rye Grass, Fall Rye Grain or Winter Wheat Grain, unless otherwise approved by the Contract Administrator.

2.3 NATIVE SEED MIXTURE

.1 Acceptable Material: Native Prairie Meadow Seed Mixture, #8135 – as supplied by Ontario Seed Company Ltd. @ www.oscseeds.com or approved equal.

.1 Alternative varieties must be scientifically demonstrated for salt tolerance and cold hardiness equal or greater than the varieties specified above. This information shall be submitted in writing from the seed producer on the Contract Administrator for review prior to the start of seeding operations.

.2 Installation instructions:

.1 To be sowed at a rate of 0.5kg per 180m²

.2 Plant during late fall period: September 15th – Oct. 31st

.3 Nurse crop to be sowed at the same time as the native seed blend.

.1 Nurse Crop: Nurse crop will be Annual Ryegrass at a rate of 0.5kg per 100m², unless otherwise approved by the Contract Administrator.

.2 Alternative varieties must be scientifically demonstrated for salt tolerance and cold hardiness equal or greater than the varieties specified above. This information shall be submitted in writing from the seed producer on the

Contract Administrator for review prior to the start of seeding operations.

2.4 WATER

- .1 Free of impurities that would inhibit germination and growth or vegetation.
- .2 Supplied by Contract Administrator at designated source.
- .3 Water for required irrigation will be supplied via supply water for required irrigation.

2.5 FERTILIZER

- .1 Fertilizer shall comply with the provisions of the Canada Fertilizers Act and Regulations.
- .2 Fertilizer shall be supplied in original factory sealed bags bearing the manufacturer's original label indicating mass and analysis.
- .3 All fertilizer shall be in granular form: dry, free flowing, and free from lumps.
- .4 Fertilizer shall be applied at a rate which will provide 0.75kg N/100m² at two month intervals.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for mechanical seeding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Contract Administrator.
 - .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
 - .3 Topsoil depth to be test and approved by Contract Administrator prior to seed placement.
 - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2 SEED BED PREPARATION

- .1 Remove and dispose of weeds; debris; stones; soil contaminated by oil, gasoline and other deleterious materials; to a licensed contaminated soils disposal site.
- .2 Verify that grades are correct. If discrepancies occur, notify Contract Administrator and commence work when instructed by Contract Administrator.
- .3 Soil shall be loosened, fine graded and uniform so as to assure a properly granulated surface or not less than 50 mm depth, with no sign of erosion. Before seed installation, the topsoil shall be friable, free from extraneous material, debris and stones and/or foreign matter or weeds.
- .4 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated to tolerance of plus or minus 15 mm, surface draining naturally.
- .5 Cultivate fine graded surface approved by Contract Administrator to 25 mm depth immediately prior to seeding.
- .6 The surface to be seeded shall be prepared not more than 7 Days before the seeding

operation.

3.3 SEED PLACEMENT

- .1 The locations and limits of the different permanent seed mixes and different cover types as specified in the Contract Documents shall be staked out on the ground surface.
- .2 Mechanical seeding, using a Brillion seeder or equivalent is the preferred method for all park seeding. All other methods shall only be considered in areas where mechanical seeding is not possible, and must be authorized as a seeding method by the contract administrator.
- .3 Seed and cover application or re-application shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.
- .4 The legume seed shall be inoculated within not more than 30 minutes prior to application, using the recommended inoculant for each variety. Sufficient dry mulch material shall be added to the legume seed to provide a colour trace to aid in attaining an even distribution of the seed.
- .5 For manual seeding:
 - .1 Use manually operated drop seeder ("Cyclone" type or equivalent).
 - .2 The cyclone spreader shall be capable of distributing seed and fertilizer uniformly in a dry state.
- .6 For Mechanical seeding:
 - .1 Broadcast seeding ('Brillion' grass seeder) shall be used under appropriate conditions and slopes as indicated by the equipment manufacturer.
 - .2 The Contractor shall ensure the area is suitably prepared for the seed application and that the seed is uniformly dispersed over the entire area.
- .7 For hydraulic seeding:
 - .1 Hydraulic seeding shall only be considered in areas where mechanical seeding is not possible, and must be authorized as a seeding method by the contract administrator.
 - .2 Seed, fertilizer, and water shall be thoroughly mixed in the hydraulic seeder and mulcher into a homogeneous water slurry. When thoroughly mixed, the water slurry shall be applied to the prepared earth areas by the nozzle sprayer or extension hose,
 - .3 The Contractor shall ensure there is a uniform dispersal of the mixed material over the entire area designated for seeding and that the spray does not dislodge soil or cause erosion.
- .8 For terra-seeding:
 - .1 The application shall only be used in areas where mechanical seeding is not possible. Seed shall be uniformly applied directly at the soil surface with a pneumatic blower.
 - .2 The pneumatic blower truck shall be equipped with a computer-calibrated seed injection system and shall be capable of uniformly applying composted topsoil and seed at a rate greater than 0.25 cubic meters of material per minute. The blower truck shall also be equipped with hoses of sufficient length to reach the seeding area.

- .3 Depth of growing medium and seed shall vary based on slope of seed application area. Depth shall be to seed supplier's recommendations.
- .9 Blend applications 300 mm into adjacent grass areas to form uniform surfaces, where applicable.
- .10 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .11 Incorporate seed by light raking in cross directions.
- .12 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Contract Administrator with equipment approved by Contract Administrator immediately after seeding.
- .13 Sow during the period of May 15 to June 15 and August 15 to October 15.
- .14 Protect all seeded areas from damage by water erosion, pedestrians and vehicles.

3.4 MULCHING

- .1 Immediately after seeding on the same day, mulch seeded area by approved method.
- .2 The Contractor shall ensure that the hydraulic seeder and mulcher is properly calibrated to provide the coverage as specified for each of the hydraulically applied cover materials.
- .3 Apply mulch evenly and uniformly at such a rate that the average depth is between 19 mm and 25 mm maximum.
- .4 Bonded Fibre Matrix (BFM): shall be installed by a Contractor certified and trained by the manufacturer in the proper mixing and installation of the product. To ensure a suitable drying and curing period, BFM shall not be applied when rainfall is expected, during rainfall, or immediately after rainfall.
- .5 Hydraulic Mulch: Hydraulic mulch shall be applied at the rate as per drawings or as recommended by the supplier. Hydraulic mulch shall be thoroughly mixed with water into a homogenous slurry. When thoroughly mixed, the hydraulic mulch slurry shall be applied to the seeded earth areas by nozzle sprayer or extension hose. The mixed material shall be evenly dispersed over the entire seeded earth area to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

3.5 EROSION CONTROL BLANKET

- .1 Install erosion control blanket on slopes only as and where directed by the Contract Administrator.
- .2 Erosion control blanket shall be placed and stapled into position as per the manufacturer's installation instructions over the entire designated surface area. Blankets shall be installed in direct contact with the ground surface to form a uniform, cohesive mat over the seeded earth area. The Contractor shall ensure that the ECB is anchored to the soil and that tenting of the ECB does not occur.
- .3 On slopes, the uppermost edge of the ECB shall be anchored in a 150 mm wide by 150 mm deep trench when the ECB cannot be extended and anchored over the crest of the slope. The trench shall be backfilled with earth and compacted.
- .4 When seed and cover materials are applied to the foliage of trees, shrubs, other susceptible plant material, or waterbodies, the Contractor shall immediately remove the seed and cover materials from the areas and wash the areas with clean water.
- .5 When seed and cover materials are applied to areas or objects other than those designated,

the Contractor shall remove the seed and cover materials.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 The duration of the Maintenance Period shall be six months, beginning immediately following the seeding and mulching operation. The duration of the maintenance period shall be suspended during the winter dormant period, from October 30 to May 1st of the following year.
- .3 No maintenance equipment, materials or other miscellaneous items may be stored on site unless approved by the Contract Administrator.
- .4 The Contractor shall ensure that the application of seed and mulching is maintained in a horticulturally acceptable manner and that erosion control is maintained until the vegetative cover is established and accepted by the Contract Administrator. The Contractor shall ensure that the soil is kept humid during the germination period. The Contractor shall re-seed and mulch areas of poor growth.
- .5 Perform following operations from time of seed application until acceptance by Contract Administrator:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Contract Administrator. Grass cutting not required for naturalized seed areas.
 - .4 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .5 Control weeds by mechanical means utilizing approved integrated pest management practices.
 - .6 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .7 Adjust protection barrier as necessary to protect against deterioration due to pedestrian or other traffic as needed.
- .6 Submit monthly written reports to Contract Administrator identifying:
 - .1 Maintenance work carried out (every 2 weeks).
 - .2 Development and condition of seeded areas.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.
- .7 Standard Seed Mix areas only:
 - .1 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Contract Administrator.

.2 Control weeds by mechanical means utilizing approved integrated pest management practices.

.8 Native Seed Mix area only:

.1 Ensure that seed comes into good contact with the soil.

.2 Area does not require mowing.

.3 At a minimum, weeding of entire naturalization area shall occur at 2 week intervals, with the first operation occurring April 16th and the final operation occurring in October. All areas shall be weeded immediately prior to the final warranty inspection. All weeds within naturalization area shall be removed by hand.

3.7 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.1 Clean and reinstate areas affected by Work.

3.8 PROTECTION

.1 Erect plastic snow fence around newly seeded areas sufficient to protect against deterioration due to pedestrian or other traffic.

3.9 INSPECTIONS & FINAL ACCEPTANCE

.1 All completed work will be inspected by the Contract Administrator until the end of the maintenance and warranty period. Inspections will be held at the end of 30, 60 and 90- Day periods following the seeding and mulch operation. A final inspection will be held at the end of the maintenance and warranty period. No inspections will be held during the winter dormant period or when the site conditions prohibit a visual inspection. The timing intervals between inspections will be suspended during the winter dormant period.

.2 At the 30-day inspection within the seeded area;

.1 The applied mulch shall be visually intact and shall form a uniform cohesive mat;

.2 Germination of the nurse crop shall be visually evident in a uniform 100% cover

.3 At the 60-Day inspection within the seeded area;

.1 The nurse crop shall be at mature height in a uniform 100% cover

.2 Germination of the specified, primary seed species shall be visually evident in a uniform cover;

.3 There shall not be any significant bare areas, both in terms of quantity and size;

.4 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded area

.4 At the 90-day inspection period within the seeded area;

- .1 The permanent seed species shall be at an average height of 50mm in a uniform 100% cover, representative of the specified, permanent seed mixes
- .2 There shall not be any significant bare areas;
- .3 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded area.
- .5 At the end of the Maintenance and Warranty Period (six months after the completion of the seeding and mulching operations);
 - .1 The permanent seed species shall be at an average height of 50mm in a uniform 100% cover, representative of the specified, permanent seed mixes;
 - .2 There shall not be any bare areas;
 - .3 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded area.
- .6 Seeded areas will be accepted by the Landscape Architect at the end of the maintenance period provided that:
 - .1 Seeded areas are showing a state of healthy growth.
 - .2 Seeded areas are free of eroded surfaces.
 - .3 There shall not be any bare areas.
 - .4 Turf areas have been cut no less than twice, the last cut being carried out within 72 hours prior to the acceptance inspection.
- .7 The duration of the Maintenance Period shall be six months, beginning immediately following the seeding and mulching operation. The duration of the maintenance period shall be suspended during the winter dormant period, from October 30 to May 1st of the following year.
- .8 If the completed work does not meet the performance criteria for seeded areas as specified above, the Contract Administrator will notify the Contractor in writing and the Contractor shall re-apply the specified materials in conformance with OPSS 804 and the Special Provisions within 14 calendar days of receiving written notification.
- .9 If the Contractor cannot apply or re-apply the seed and mulch due to site conditions or for any other reason, the Contractor shall maintain the site and control erosion until conditions permit application of the seed and mulch.
- .10 All replaced seed and mulch shall be subject to a further six-month maintenance and warranty period.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards for Nursery Stock – Eighth Edition.
- .2 Government of Canada Department of Justice (GCDJ)
 - .1 F 10 'Fertilizers Act'.
 - .2 C.R.C., c. 666 'Fertilizers Regulations'
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 803, Construction Specification for Sodding

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule sod laying to coincide with preparation of soil surface.
 - .2 Schedule sod installation when frost is not present in ground.
 - .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sod, and geotextile where applicable and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
- .2 Samples.
 - .1 Submit:
 - .1 0.5 kg container of each type of fertilizer used.
 - .2 Obtain approval of samples by Contract Administrator.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with supplier's recommendations.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Commercial Grade Turfgrass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Kentucky Bluegrass Sod:
 - .1 100% Kentucky Bluegrass (*Poa pratensis*) and shall conform to the requirements of the Ontario Sod Growers Association.
 - .2 A blend of a minimum of three (3) Kentucky bluegrass cultivars from multiple genetic varieties including but not exclusive to the following varieties licensed for sale in Canada by Agriculture Canada to create a genetically diverse stand;
 - i. Aldephi,
 - ii. Banff
 - iii. Bronco
 - iv. Midnight
 - v. Nugget
 - vi. Touchdown
 - .2 Number One Named Cultivars: Alternative varieties must be scientifically demonstrated for salt and drought tolerance and cold hardiness equal to or greater than the varieties specified above. This information shall be submitted in writing from the sod grower to the Contract Administrator for review prior to the start of sod production.
 - .3 Sod shall be seeded and established in nursery sod fields as a turfgrass sod. Sod shall be uniform in texture, and in good healthy condition with no sign of decay. There shall be no more than 5 broadleaf weeds per 40 m² of sod and up to 20% non-specified grass seed. Sod shall be of sufficient density that no surface soil is visible. The grass height shall be 30 mm minimum and 70 mm maximum.
 - .4 The soil portion of the sod shall be a good mineral type soil with a thickness of 10 mm minimum and 15 mm maximum. Each sod piece shall be well permeated with roots. Individual sod pieces shall be in such condition so that each may be lifted, rolled, transported, and placed without breaking or tearing and without loss of soil under normal handling conditions.
 - .5 The soil thickness at harvest will be 6 mm minimum and 15 mm maximum beneath no more than 12.5 mm of thatch. Each sod piece shall be well-permeated with roots. Individual sod pieces shall be in such condition so that each may be lifted, rolled, transported, and placed without breaking or tearing and without loss of soil under normal handling conditions.
 - .6 Sod shall contain sufficient moisture to maintain its vitality during transportation and placement.
 - .7 Only mineral soil sod is acceptable. Peat sod is not acceptable.
- .2 Water:
 - .1 Water shall be potable.
- .3 Fertilizer:

- .1 To Canada "Fertilizers Act" and Fertilizers Regulations.
- .2 The type and application rate of fertilizer shall be determined by soil tests. For estimating purposes, the Contractor may assume the use of a commercial granular type, such as 16-20-0 applied at a rate of 4 kg/m² (400 kg per hectare).
- .3 Fertilizer shall be dry, free flowing, free from lumps and shall be supplied in bags bearing the manufacturer's label indicating mass and analysis.
- .4 Stakes: Stakes for fastening sod to the earth grade shall be a minimum 150 mm in length.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain written approval from Contract Administrator of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Contract Administrator.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Contract Administrator.
 - .2 Inform Contract Administrator 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 Contract Administrator.

3.2 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator and commence work when instructed by Contract Administrator.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated, to tolerance of plus or minus 8 mm, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 13 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site or in location as directed by Contract Administrator
- .5 At the time of sodding, all surface areas designated for sodding shall be free of erosion and shall have a fine graded uniform surface.
- .6 The surface shall be uniformly cultivated to a minimum depth of 50 mm and shall not have surface materials greater than 25 mm in size, such as stones and clods and weeds or other unwanted vegetation
- .7 Fertilizer shall be applied uniformly immediately prior to laying of sod with a calibrated drop or centrifugal spreader, and shall be mixed into the upper 50 mm of the topsoil.

3.3 SOD PLACEMENT

- .1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.
- .2 Voids shall not be left between the soil portion of the sod and the underlying ground surface.
- .3 Sod shall be securely placed lengthwise across the face of slopes and parallel to the centreline of ditches.
- .4 End joints of adjacent sod pieces shall be staggered. The edges of adjacent sod pieces shall be placed tightly against one another without overlapping.
- .5 Sod shall be countersunk to existing grade level at all edges.
- .6 Joints shall be tamped to a uniform surface. Sod shall be placed up to the subgrade elevation on the roadway front slope. Where required, sod should be staked to the grade to avoid movement.
- .7 Sod shall not be separated from its mineral soil base and not damaged during transportation, handling, and placement.

3.4 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3-6 pegs per square metre.
 - .3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Contract Administrator.
 - .4 Drive pegs to 20 mm above soil surface of sod sections.

3.5 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods as per the recommendations of the soil tests.

3.6 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
 - .1 Clean and reinstate areas affected by Work.

3.7 PROTECTION BARRIERS

- .1 Protect newly sodded areas from deterioration with snow fence on rigid frame as directed by Contract Administrator.
- .2 Remove protection after inspection and as directed by Contract Administrator.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 The sod shall be maintained for 60 consecutive days following completion of the sod placement, excluding the winter dormant period being from October 31st to May 1st. All placed sod is to be kept healthy, actively growing, and green in leaf colour
- .2 Perform following operations from time of installation until acceptance.
 - .1 The Contractor shall notify the Contract Administrator immediately prior to following each watering operation.
 - .2 Watering operations shall not be carried out between 11 00 h and 17 00 h.
 - .3 Water shall be applied in sufficient quantities to thoroughly soak the upper 100 mm of topsoil, and shall be applied in a soft spray to avoid packing and splattering the soil.
 - .4 During the first week after installation, sodded areas shall be watered daily.
 - .5 In weeks two and three after installation, sodded areas shall be watered every second day and thereafter shall be watered weekly until the end of the 60 days' maintenance period and final acceptance.
 - .6 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
 - .7 In the event of drought conditions as determined by the Contract Administrator, sod shall be watered daily.
 - .8 The grass in sodded areas shall be cut at regular intervals to maintain a 60 mm to 100 mm height. Not more than 1/3 of the grass height shall be cut at any one mowing. Clippings over 20 mm in length shall be removed.
 - .9 Maintain sodded areas weed free 95%.
 - .10 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.
 - .11 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.9 ACCEPTANCE

- .1 At the end of the 60 consecutive days' maintenance period, an inspection of all placed sod shall be made by Town of Marathon staff or Appointed Representative.
- .2 Areas sodded after October 31 will be accepted in the following spring, 60 days after the start of the growing season, provided that the above conditions are met.
- .3 Sod areas will be accepted by Town of Marathon Staff or Appointed Representative provided that:
 - .1 Sodded areas are uniformly green and succulent and show evidence of rooting into the underlying soil;
 - .2 All placed sod shall be in the same location as originally placed and shall not have moved, eroded, slipped, or sloughed;
 - .3 The sod shall be of sufficient density that no surface soil is visible;
 - .4 There shall be no competitive growth beyond that detailed under the Sod subsection, emerging from the sod or from between the sod joints;
 - .5 Sodded areas have been cut minimum 2 times prior to acceptance.
- .4 All sodded areas, which fail to conform to OPSS 803, Construction Specification for Sodding and the requirements of this specification shall be replaced by the Contractor at no additional cost to the contract, and shall be subject to the same acceptance conditions.
- .5 All replaced sod shall be subject to the Quality Assurance section of this specification and

shall be subject to a further maintenance period of 60 consecutive days.

- .6 The Contractor will not be held responsible for damage of sodded areas due to salt, snow removal or vandalism.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Agriculture and Agri-Food Canada (AAFC).
 - .1 Plant Hardiness Zones in Canada-2000.
 - .2 Canadian Nursery Landscape Association (CNLA)
 - .3 Canadian Standards for Nursery Stock-2006.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Ontario Provincial Standard Specifications
 - .1 OPSS 801, Construction Specification for the Protection of Trees
 - .2 OPSS 804, Construction Specification for Seed and Cover

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling: obtain approval from Contract Administrator of schedule 7 days in advance of shipment of plant material.
- .2 Schedule to include:
 - .1 Quantity and type of plant material.
 - .2 Shipping dates.
 - .3 Arrival dates on site.
 - .4 Planting Dates.
- .3 The Contractor shall be fully acquainted with all relevant Provincial and Municipal By-laws relating to the work of this contract, and will be required to comply with such by-laws without extra compensation

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for fertilizer, mycorrhiza, anti-desiccant, anchoring equipment, and mulch and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 1 copies of WHMIS MSDS where applicable.
- .2 Samples:
 - .1 Submit samples of mulch, and mycorrhiza.

1.4 QUALITY ASSURANCE

- .1 Qualifications: Contractor shall provide proof of a foreman with a minimum of five years' experience, competent and skilled in the work of this section to direct all of the work to be performed, and to be present at all times during the performance of the work. Acceptable forms of:
 - .1 ISA Certification as an arborist,
 - .2 Diploma in horticulture from a recognized College,
 - .3 Ontario Tradesman Certificate,
 - .4 An acceptable combination of education, training and experience, as determined by the Contract Administrator.
- .2 Substitutions:
 - .1 Substitutions to the plant material as indicated on the planting plan are not permitted unless prior written approval of the Contract Administrator has been obtained regarding type, variety and size. Plant substitutions must be of similar species and of equal or greater size than those originally specified. No additional costs will be entertained for substituted plant material. Sizes as indicated are the minimum allowable after pruning.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance Canadian Standards for Nursery Stock 8th edition.
- .2 The shipping of plant material should be coordinated with planting operations in order to ensure minimum time lapse between digging and replanting of the nursery stock.
- .3 Roots, rootballs, trunks and branches of all trees and shrubs shall be protected from sun and wind while in transit and until planted. Protect plant material from damage during transportation:
 - .1 During shipping, tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit.
 - .2 Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant.
 - .3 Keep roots moist.
- .4 Storage and Handling Requirements:
 - .1 Immediately store and protect plant material which will not be installed within 1 hour in accordance with supplier's written recommendations.
 - .2 Balled and burlapped or container grown material shall not be stored on the contract site unless the rootball or container is protected from sun and wind and kept moist.
 - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
 - .4 All deciduous trees which have broken bud and all coniferous trees shall be thoroughly sprayed with an anti-desiccant immediately upon delivery to the contract site.

- .5 Store and manage hazardous materials in accordance with manufacturer's written instructions.

1.6 WARRANTY

- .1 For all plant material as itemized on plant list a 12 months' warranty is required.
- .2 End-of-warranty inspection will be conducted by Landscape Architect.
- .3 Contract Administrator reserves the right to extend Contractor's warranty responsibilities for an additional 1 year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

Part 2 Products

2.1 MATERIALS

- .1 Plant Material: All plant material shall conform to the requirements of the latest edition of the Canadian Specification for Nursery Stock, prepared by the Canadian Nursery Trades Association. Source of plant material: grown in Zone 2-3 in accordance with Plant Hardiness Zones in Canada.
 - .1 All plant material shall be clearly identified by labels indicating species, size and grower.
 - .2 All plant material supplied and planted under this contract shall be protected from damage in accordance with OPSS 801, during construction operations. All plant material shall be considered as "specimen trees" for the purposes of protection. Plant material damaged by the Contractor's operations shall be considered unacceptable.
 - .3 Plant material shall be acceptable when it is structurally sound, conforms to species growth characteristics is well furnished with living foliage, has normal colour, shows adequate annual growth and formation of buds and free from disease, insect infestations, rodent damage, sunscald, frost cracks and other abrasions or scars to the bark. Plant material that does not meet this condition or has "died back" and has regrown from a shoot or bud shall be considered unacceptable.
 - .4 Plant material shall not be collected or dug from native stands or an established woodlot.
 - .5 Container grown plant material shall have been grown in the same container for a minimum period of 6 months.
 - .6 Plant material shall not be cut back from larger sizes to meet the material requirements.
 - .7 Plant material sizes shall be acceptable up to 40% (forty percent) above the minimum specified sizes.
 - .8 The seed source of the specified plant material and the plant material itself shall be supplied from no more than one hardiness zone difference from the hardiness zones in this contract.
 - .9 Where balled and burlapped plant material is specified, the burlap, rope and any tie

materials shall be manufactured from natural organic fibres.

- .2 Watering: The Contractor shall be responsible to obtain any permits or certificates for water usage.
 - .1 Water: Free from any contaminants which adversely affect growth. Water shall be applied at a temperature not greater than 10 C below the ambient air temperature. The Contractor shall be responsible to obtain any permits or certificates for water usage.
 - .2 Tanks: Tanks(s) used for storage, mixing or application of water shall be clean and free of any contaminants which may be hazardous to the growth and development of trees and shrubs or to the environment in general.
 - .3 Pumps: For watering trees and shrubs shall be capable of reaching the limits of the right-of-way. The outlet end of the hose(s) shall be 25 mm in diameter with a quick shut-off valve connected to a functioning water injection pipe.
 - .4 Hoses: Hoses used for watering plant material shall be capable of reaching the limits of the contract area. The outlet end of the hose(s) shall be 25 mm in diameter with a suitable adjustable nozzle(s) and a quick shut-off valve.
- .3 Stakes:
 - .1 Stakes used to support trees shall be 50 mm by 50 mm by 2.4 m.
 - .2 Stakes used to secure arbour ties shall be 50 mm by 50 mm by 600 mm.
- .4 Arbor Ties:
 - .1 Ties shall be securely fastened around the trunk in the direction of the prevailing wind.
- .5 Tree Guards:
 - .1 To protect deciduous trees 2.5 m height and greater from rodent damage shall be one of the following:
 - .1 13 mm wire mesh (hardware cloth) guard of 0.5 mm galvanized steel supplied in 600 mm wide rolls;
 - .2 An expanded diamond pattern wire mesh of 0.4 mm galvanized steel supplied in 600 mm width; Mulch: shall be clean, free from extraneous material and manufactured of shredded cedar.
 - .3 150 mm plastic drainage pipe, ultra-violet protected supplied in minimum 600 mm lengths;
 - .4 Hogs rings or clips for fastening wire mesh tree guards shall have a minimum diameter of 1.5 mm;
 - .2 Tree guards to protect deciduous tree whips shall be a white spiral plastic tree wrap, perforated and ultra-violet protected supplied in minimum 600 mm lengths.
- .6 Topsoil: to Section 32 91 19.13, Topsoil Placement and Grading
- .7 Fertilizer:

- .1 Slow release fertilizer tablets shall be Evergrow (20-10-5) Tablets as supplied by Plant Products Company Limited, 314 Orenda Road, Brampton, Ontario L6T 1G1 (905) 793-7000, or approved equivalent.
- .2 Liquid fertilizer shall be water soluble at a ratio of 20-20-20.
- .3 Fungal/ Bacterial Inoculants: Myke Tree and Shrub, applied as per manufacturer's instructions for new trees, or approved equivalent.
- .8 Anti-desiccant: emulsion to form permeable film over plant surfaces and mixed according to manufacturer's directions.

2.2 SOURCE QUALITY CONTROL

- .1 The supplier of the plant material shall be available for review by the Contract Administrator within ten (10) calendar days of request.
- .2 Inspections:
 - .1 Acceptance of the plant material at its source does not prevent rejection for the material delivered on-site or during planting operations.
 - .2 All plant material will be inspected by the Contract Administrator upon arrival on site, prior to planting, and at substantial completion of the plant material installation.
 - .3 Approval cannot be granted for trees already planted before inspections.
 - .4 All trees must be unwrapped and viewable from all sides in order to be approved.
 - .5 Inspections will include all original and replacement material. Units of plant material which are unacceptable shall be rejected by the Contract Administrator. Rejected plant material will be replaced by the Contractor at the earliest opportunity.
 - .6 Rejected plant material shall be removed from the site within twenty-four hours.
- .3 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.
- .4 Testing laboratory means a facility accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL) and/or Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), to complete the tests as required by the submission requirements

Part 3 Execution

3.1 SCHEDULE

- .1 The work of this specification shall be completed in the spring only and as outlined under the following table: Time Constraints for Planting. Fall planting will not be allowed unless approved by the Contract Administrator.

Plant Type	Completion Date
B&B/ Container Grown: Coniferous & Deciduous Trees	Frost-free conditions to May 30th

3.2 EXAMINATION

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

3.3 PRE-PLANTING PREPARATION

- .1 Proceed only after receipt of acceptance of plant material from Contract Administrator.
- .2 Remove damaged roots and branches from plant material.
 - .1 All pruning equipment shall be designed specifically for tree work and shall be clean, sharp and in proper, safe, working order.
 - .2 Pruning equipment shall be capable of producing clean, flush cuts without tearing or fraying the bark.
 - .3 All pruning shall be carried out in accordance with Agriculture Canada Publication 1507-1977 "The Pruning Manual".
- .3 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.
- .4 The locations of nursery stock trees shall be staked out on the ground for review by the Contract Administrator.
- .5 Locate and protect utility lines.
- .6 Excavation shall commence following the Contract Administrator's inspection and approval of staking.

3.4 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Establishment of sub-grade for planting beds in accordance with Section 31 23 33.1 Excavating Trenching and Backfilling.
- .2 Preparation of planting beds in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
- .3 For individual planting holes:
 - .1 Stake out location and obtain approval from Contract Administrator prior to excavating.
 - .2 Excavate to depth and width as indicated.
 - .3 Remove rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
 - .4 The bottom of all planting pits shall be protected from freezing.
 - .5 The sides of the planting pit shall be scarified to facilitate the movement of roots and

moisture.

- .6 Remove water which enters excavations prior to planting. Notify Contract Administrator if water source is ground water.

- .4 Dispose of excess excavated material as specified elsewhere in the contract and at no additional cost.
- .5 Place the appropriate number of slow-release fertilizer tablets according to the manufacturer's printed application rate, into each planting pit for all trees and shrubs.

3.5 TOPSOIL

- .1 Topsoil to be sourced, handled and installed as per Section 32 91 19.13 Topsoil Placement and Grading.

3.6 PLANTING

- .1 Plant material shall not be placed in the planting pit until all evidence of frost has left the ground site.
- .2 Plant material supplied in containers shall have the containers carefully removed prior to planting. The rootball shall be slit vertically 3 times evenly around the circumference to a maximum depth of 13 mm.
- .3 Plant material supplied balled and burlapped shall have all the burlap, ropes, and ties removed from the top of the rootball. All synthetic materials shall be removed prior to planting.
- .4 Plant material supplied in wire baskets shall have the basket, burlap, ropes and ties removed from the top one-third of the rootball. The wire basket shall be removed from the entire circumference of the wire basket after placement of the plant material and prior to backfilling.
- .5 Placement of Plant:
 - .1 Plant vertically in locations as indicated.
 - .2 Orient plant material to give best appearance in relation to structure, roads and walks.
 - .3 All plant material shall be planted so that their normal ground elevation is at existing grade
- .6 Backfilling:
 - .1 The soil excavated from the pits shall be thoroughly mixed at a 1:1 ratio with the horticultural topsoil and utilized as backfill during the planting operations.
 - .2 Backfill soil in 150 mm lifts.
 - .1 Tamp each lift to eliminate air pockets.
 - .2 Take care not to injure the root system.
 - .3 Air pockets shall not be allowed to form when backfilling.
 - .4 Compact topsoil mixture, to the approval of the Contract Administrator.
 - .3 When the planting pit has been backfilled to ground level, the final backfill layer shall

be applied to form a berm of maximum 100 mm height and maximum 150 mm width around the outside perimeter of each planting pit. The berm may be formed from the excavated material. This berm will serve to retain water over the root area. If the pit is on a slope, the lower edge and sides shall be built up to catch and hold water.

- .4 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

3.7 TREE SUPPORT & CARE

- .1 All trees, excluding conifers less than 1.5 m in height and tree whips, shall be guyed or staked and tied immediately following planting to ensure vertical alignment and plant stability in accordance with contract drawings.
- .2 Use single stake tree support for all trees unless otherwise instructed by the Contract Administrator.
 - .1 Place stake on prevailing wind side and 150mm minimum from trunk.
 - .2 Drive stake 150mm minimum into undisturbed soil beneath roots.
 - .1 Ensure stake is secure, vertical and unsplit.
 - .2 Secure stake around trunk and main branches with a 2cm wide woven polyester tie, with minimum break strength of 409kg strength.
- .3 Pruning:
 - .1 After tree supports have been installed, remove broken branches with clean, sharp tools.
 - .2 The natural shape or habit of the plant shall not be changed.
 - .3 Pruning shall be carried out according to size and species in accordance with accepted arboricultural practice.
 - .4 Coniferous trees shall be pruned only to remove dead, broken or injured branches.
- .4 Tree Guards:
 - .1 Protective guards shall be installed around all trees to prevent rodent damage. The contractor shall notify the contract Administrator of tree guard type for approval prior to commencement of work of this item.
 - .2 Wire mesh guards shall be cut in lengths sufficient to complete a circumference of the tree trunk, maintaining a minimum 50 mm distance from the tree trunk, as well as providing a minimum 25 mm overlap. Guards shall be a minimum of 600 mm in height. Wire mesh guards shall be fastened using a minimum of 4 hog rings or clips per guard.
 - .3 White plastic drainage pipe shall be cut to a minimum 600 mm length and then slit once vertically and placed around the tree trunk.
 - .4 Ensure the base of the tree guards rest on the ground, and there is continuous contact with the ground. Tree guard base to be covered with 50 mm of mulch.
- .5 Trunk Protection:

- .1 Install trunk protection on deciduous trees as indicated.
- .2 Install trunk protection before installation of tree supports.

3.8 MULCHING

- .1 Immediately after planting, prior to the initial watering and placement of tree guards, mulch shall be applied in a uniform continuous blanket to the surface area surrounding each individual plant.
- .2 Contractor to submit mulch product options for approval.
- .3 Install mulch after installation of hedgerow and nursery stock plant material to a depth of 75 mm. The Contractor shall be responsible to remove any mulch in excess of 85 mm depth.
- .4 For all trees, the mulch surface area shall extend over the actual planting pit and the earth berm and include a 1.8m diameter from center of the tree.
- .5 For shrubs, the complete surface area of each shrub bed, including the entire surface area within the perimeter of the shrub grouping shall be mulched. Mulch shall extend to the limit of the bed preparation.
- .6 Install mulch so that there is a gap between the trunk and the mulch. Mulch should never be piled against bark.

3.9 INITIAL WATERING & FERTILIZATION

- .1 Initial watering of all plant material shall be completed immediately after mulching. Sufficient water shall be applied to each plant to thoroughly soak the root zone.
- .2 20-20-20 fertilizer shall be added for the watering of the nursery stock deciduous and coniferous trees only. Do not apply liquid fertilizer to the planting beds which contain compost. Add fertilizer in accordance with manufacturers recommendations.
- .3 Water shall be uniformly applied to each individual tree by two injection applications directly into the soil. Both injections shall be located at the outer edge of the planting pit area and shall penetrate the ground to a depth of 450 mm at the commencement of the watering operation. The second injection shall be located 180 degrees from the initial injection.
- .4 Water shall be uniformly applied to each shrub bed at a low rate to avoid dislocating mulch, soil, plant material and run offs. Ensure a minimum penetration of 200 mm depth.

3.10 MAINTENANCE DURING WARRANTY PERIOD

- .1 All plant material shall be maintained and warranted for a period of two years. Expiry of the maintenance and warranty clause shall be two years upon completion of planting.
- .2 No maintenance equipment, materials or other miscellaneous items may be stored on site unless approved by the Contract Administrator.
- .3 The Contractor shall provide maintenance immediately after each portion of planting is completed and continue throughout the period of warranty to the satisfaction of the Contract Administrator.
- .4 Watering: During the warranty period, between May 15 and September 15 of each year, watering of all plants shall be carried out no less than twelve, (12) times, in accordance with the watering schedule to be determined by the Contract Administrator.
 - .1 Water application rates to Table 1, F-8024.

- .2 Soak Method: The planting saucer of each tree shall be filled with water and the water allowed to percolate into the soil before being re-filled as many times as necessary to supply 170L of water for a 40-80mm caliper, or 1.2-1.8m tall tree.
- .3 All coniferous trees shall be watered in late fall, just prior to freeze-up.
- .4 Water shall be applied so that the washing of the soil or dislodging of mulching or tree guards does not occur. Damage shall be immediately repaired to the satisfaction of the Contract Administrator at no additional cost.
- .5 Rodent repellent shall be a liquid, formulated to contain 12% Thiram, coloured as to remain visible for a minimum of twenty-four hours after application.
 - .1 Acceptable product is "Scoot" or approved equal.
 - .2 The Contractor shall be responsible to monitor plant material throughout the winter and for re-applying rodent repellent as required.
- .6 Fertilizing:
 - .1 Apply fertilizer in early spring as per recommendations from soil test:
 - .2 Fertilizer shall be a complete commercial type. Formulation and application rate to be determined by soil tests. For estimating purposes, use 10-52-10 applied at a rate of:
 - .1 0.9 kg for each 25 mm of tree caliper (water soluble)
 - .2 0.9 kg per cubic metre of topsoil for planting/shrub beds (granular form)
- .7 Winter protection for Conifers:
 - .1 Wrapping material for winter protection of coniferous trees greater than 600mm in height, shall be new burlap, at least 270 g/m² in weight supplied in 1.0 m wide or 1.5 m wide rolls.
 - .2 Edges of the wrap shall be overlapped a minimum of 100 mm with the exposed edge folded back under and fastened with metal fasteners.
 - .3 After each tree is wrapped, the burlap will be securely fastened with nylon twine or wire to ensure that the wrapping does not unravel.
 - .4 All wrapped trees shall be unwrapped by the Contractor during the following spring, prior to bud break. All materials used to wrap and unwrap the trees shall be removed from the contract site.
- .8 Removal of Salt Spray:
 - .1 When natural spring precipitation (Apr 1 - 30) of each warranty year is less than 80 mm, the above ground parts of all plant material, within 10 m of the roadway edge upwind of prevailing winds and within 100 m of the roadway edge downwind of prevailing winds, shall be thoroughly sprayed with water to remove salt spray deposits prior to May 15.
 - .2 A soft spray nozzle shall be used.
 - .3 Precipitation data shall be as per Environment Canada from the Macdonald-Cartier Airport weather station.

- .9 Other maintenance requirements:
 - .1 Reform damaged watering saucers. Any additional topsoil required shall originate from the same source as the initial approved product.
 - .2 Remove dead, broken or hazardous branches from plant material.
 - .3 At a minimum, weeding shall occur at one month intervals, with the first operation occurring at the beginning of July and the final operation occurring in early October. All areas shall be weeded immediately prior to the final warranty inspection. All weeds and grasses within saucers, beds and mulched areas around plant material shall be removed by hand.
 - .4 Replace or respread damaged, missing or disturbed mulch.
 - .5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
 - .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. The use of pesticides must be in accordance with Ontario's Cosmetic Pesticide Ban Act.
 - .7 Keep trunk protection and tree supports in proper repair and adjustment. In the autumn and spring of each warranty year, the Contractor shall re-position or replace rodent guards to meet the specifications. Rodent guards shall originate from the same source as the initial approved product.
 - .8 In the autumn of the first warranty year, the Contractor shall ensure that all stakes are secure and functioning properly.
 - .9 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
 - .10 Throughout the extended maintenance and warranty period, units of plant material that are found to be unacceptable will be replaced by the Contractor at the earliest opportunity.
 - .1 All replacement plant material shall be as per the size indicated on the drawings. These sizes are the minimum allowable.
 - .11 Submit monthly written reports to Contract Administrator identifying:
 - .1 Maintenance work carried out.
 - .2 Development and condition of plant material.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.
 - .12 All debris, waste and other extraneous material resulting from the maintenance operation shall be removed from the site daily upon completion of maintenance, unless otherwise directed or approved by the Contract Administrator.
- .10 Final Warranty Inspection:
 - .1 A one-time inspection of all plant material shall be carried out by the Contract Administrator upon completion of the extended maintenance and warranty period.

- .2 Plant material shall be acceptable when it meets the quality requirements of Canadian Nursery Trade Association (C.N.T.A.) for plant material. All planting pits, beds, and other areas worked by the Contractor shall be free of weeds and in good order, including the removal of all stakes, ties, and rodent guards.
- .3 Plant material shall be unacceptable when it does not meet this quality standard.
- .4 Units of plant material that are found to be unacceptable will be replaced by the Contractor at the earliest opportunity in accordance with Canadian Nursery Trade Association (C.N.T.A.) for plant material. The Contract Administrator reserves the right to extend the Contractor's maintenance and warranty responsibilities for an additional one-year for replacement plant material
- .5 In the event that this inspection is satisfactory to the Contract Administrator, and that there are no outstanding commitments to the contracted works, the Contractor will be given final approval of the maintenance and warranty requirements.

3.11 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 At the completion of planting operations, all areas disturbed or damaged from execution of this work shall be restored to their original condition, including, but not restricted to clean-up, regrading and seeding and mulching.
- .3 Dispose of unused fertilizer, anti-desiccant and all potentially hazardous materials at official hazardous material collection site approved by Contract Administrator.
- .4 Divert unused wood and mulch materials from landfill to composting facility approved by Contract Administrator.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for water mains, valves, valve boxes, and valve chambers and services lines.

1.2 RELATED SECTIONS

- .1 Section 31 00 00.01 Earthwork and Related Work

1.3 REFERENCES

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 NSF/ANSI 60 Drinking Water Treatment Chemicals
 - .2 C901-17 Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D 3139 Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B137.1-13, Polyethylene (PE) Pipe, Tubing, and Fittings for Cold Water Pressure Services [Part of B137 Series-05, Thermoplastic Pressure Piping Compendium]
- .4 Ontario Provincial Standard Specifications (OPSS). All OPSS references shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial oriented specification is specified in the Contract Documents.
 - .1 OPSS 441 Nov 2016 – Construction Specification for Watermain Installation in Open Cut.
 - .2 OPSS 442 Nov 2016 – Construction Specification for Corrosion Protection on New and Existing Watermains
 - .3 OPSS 450 Nov 2021 – Construction Specification for Pipeline and Utility Installation in Soil by Horizontal Directional Drilling
 - .4 OPSS 501 Nov 2017 – Construction Specification for Compacting
 - .5 OPSS 1010 Nov 2013 - Material Specification for Aggregates-Base, Subbase, Select Subgrade, and Backfill Material.

1.4 SUBMITTALS

- .1 Pipe certification to be on pipe.

1.5 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.

- .2 Submit schedule of expected interruptions to Consultant and Town of Marathon for approval and adhere to interruption schedule as approved by Consultant and Town of Marathon.
- .3 Contractor to coordinate with the Town of Marathon to ensure Town of Marathon representative is on-site during installations.
- .4 Do not interrupt water service for more than 3 h and confine this period between 10:00 and 16:00 h local time unless otherwise authorized.
- .5 Notify fire department of any planned or accidental interruption of water supply to hydrants.
- .6 Provide "Out of Service" sign on hydrant not in use.
- .7 Advise local police department of anticipated interference with movement of traffic.

1.6 QUALITY ASSURANCE

- .1 Do not begin backfilling or filling operations until material and subgrade has been approved by Consultant.

PART 2 PRODUCTS

2.1 PIPE, JOINTS AND FITTINGS

- .1 Polyethylene pressure pipe: to AWWA C901, DR 11
 - .1 Polyethylene pressure pipe fittings to CSA B137.1

2.2 THAW/TRACER WIRE

- .1 Fourteen (14) gauge TW solid copper light coloured plastic coated tracer wire.

2.3 PIPE INSULATION

- .1 Extruded Polystyrene Rigid Insulation – Owens Corning Foamular C-300 or approved equivalent.

2.4 CURB STOP AND CURB BOX

- .1 Mueller Curb Stop and Box. Curb stops, couplings, corporation stops, service boxes, and service saddles shall be as recommended by the manufacturer of the service connection pipe and approved by the consultant.

2.5 VALVES AND VALVE BOXES

- .1 Gate valves: to ANSI/AWWA C509, opening counter-clockwise, working pressure 1375 kPa.
 - .1 Stem sealing on non-rising stem valves shall use O-ring type seals that do not require adjustment.

- .2 Mueller Valve and Valve Box approved by the Town of Marathon and Consultant.

2.6 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular B Type III to OPSS 1010 with maximum particle size of 26.5mm.

2.7 BACKFILL MATERIAL

- .1 As indicated and in accordance with Section 31 00 00.01 Earthwork and Related Work.

2.8 PIPE DISINFECTION

- .1 Sodium hypochlorite to ANSI/NSF 60 to disinfect water mains. Flushing and disinfection shall comply with OPSS 441, MOECC Watermain Disinfection Procedure.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Consultant.
 - .2 Remove defective materials from site as directed by Consultant.

3.2 TRENCHING

- .1 Do trenching work in accordance with Section 31 00 00.01 Earthwork and Related Work.
- .2 Trench depth to provide cover over pipe of not less than 2.2 m from finished grade.
- .3 Trench alignment and depth require Consultant's approval prior to placing bedding material and pipe.

3.3 HORIZONTAL DIRECTIONAL DRILLING

- .1 Directional drill in locations indicated on contract drawings.
- .2 Directional drill depth to provide cover over pipe of not less than 3.0 m from finished grade.
- .3 Trench alignment and depth require Consultant's approval prior to placing bedding

3.4 GRANULAR BEDDING

- .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 150 mm below bottom of pipe.

- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to suit joints.
- .5 Compact each layer full width of bed in accordance with OPSS 501. Compact granular material to 98% SPMDD.
- .6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.5 PIPE INSTALLATION

- .1 In direction drilling locations, install pipe in accordance with OPSS 450
- .2 Terminate building water service 1.5 m outside building wall as indicated. Install coupling necessary for connection to building plumbing. If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.
- .3 All pipe installation to be done by licensed plumber. Obtain Plumbing Permit for work from Building Inspection Division.
- .4 Lay and join pipes to manufacturer's standard instructions and specifications.
- .5 Bevel or taper ends of PE pipe to match fittings.
- .6 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
- .7 Lay pipes on prepared bed, true to line and grade.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
 - .2 Take up and replace defective pipe.
 - .3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.
- .8 Face socket ends of pipe in direction of laying. For mains on grade of 2% or greater, face socket ends up-grade.
- .9 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
- .10 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.
 - .1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .11 Position and join pipes with equipment and methods approved by Consultant.
- .12 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

- .13 Align pipes before jointing.
- .14 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.
- .15 Avoid displacing gasket or contaminating with dirt or other foreign material.
 - .1 Remove disturbed or contaminated gaskets.
 - .2 Clean, lubricate and replace before jointing is attempted again.
- .16 Complete each joint before laying next length of pipe.
- .17 Minimize deflection after joint has been made.
- .18 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
- .19 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Consultant.
- .20 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .21 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
- .22 Supply and install corrosion protection as per OPSS 442.
- .23 Install thaw / tracer wire along all non-metallic water distribution piping. Secure wire to pipeline with electrical tape at 3 metre intervals. Cadweld wire to hydrant boots. Test conductivity following backfill of trenches.
- .24 Do not lay pipe on frozen bedding.
- .25 Construct pipe insulation as indicated.
- .26 Do hydrostatic and leakage test with consultant present.
- .27 Backfill remainder of trench.

3.6 VALVE INSTALLATION

- .1 Install valves to manufacturer's recommendations at locations as indicated.
- .2 Support valves located in valve boxes or valve chambers by means of treated wood blocks. Maximum length of pipe on each end of valve shall be 1 m. Valves not to be supported by pipe.

3.7 SERVICE CONNECTIONS

- .1 Terminate building water service 1.5 m outside building wall as indicated.
 - .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 Do not install service connections until satisfactory completion of hydrostatic and leakage tests of water main.
- .3 Construct service connections at right angles to water main unless otherwise directed.
- .4 Use tapping sleeves where specified. Otherwise, connections to existing mains shall be made using cut in tees and required fittings.
- .5 Employ only competent workmen equipped with suitable tools to carry out tapping of mains, cutting and flaring of pipes.

3.8 THRUST BLOCKS AND RESTRAINED JOINTS

- .1 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground.
- .2 Keep joints and couplings free of concrete.
- .3 Do not backfill over concrete within 24 hours after placing.
- .4 Restrained joints: shall be epoxy coated Smith-Blair 441 or Robar Type 1506 complete with 316 stainless steel or core blue nuts and bolts. Use galling compound on threads.

3.9 HYDROSTATIC AND LEAKAGE TESTING

- .1 Do tests in accordance with NFPA 24.
- .2 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
- .3 Notify Consultant at least 24 hours in advance of proposed tests.
 - .1 Perform tests in presence of Consultant.
- .4 Where section of system is provided with concrete thrust blocks, conduct tests at least 5 days after placing concrete or 2 days if high early strength concrete is used.
- .5 Test pipeline in sections not exceeding 365m in length, unless otherwise authorized by Consultant.
- .6 Upon completion of pipe laying and after Consultant has inspected Work in place, surround and cover pipes between joints with approved granular material placed to dimensions indicated. The City Plumbing Inspector may require to inspect pipes prior to covering.
- .7 When testing is done during freezing weather, protect hydrants, valves, joints and fittings from freezing.
- .8 Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.
- .9 Open valves. Valves at property line to be operated by City staff only.

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- .10 Expel air from main by slowly filling main with potable water.
 - .1 Install corporation stops at high points in main where no air-vacuum release valves are installed.
 - .2 Remove stops after satisfactory completion of test and seal holes with plugs.
 - .11 Thoroughly examine exposed parts and correct for leakage as necessary.
 - .12 Apply hydrostatic test pressure of 1035 kPa based on elevation of lowest point in main and corrected to elevation of test gauge, for period of 2 hours.
 - .13 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
 - .14 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
 - .15 Repeat hydrostatic test until defects have been corrected.
 - .16 Define leakage as amount of water supplied from water storage tank in order to maintain test pressure for 2 hours.
 - .17 Do not exceed allowable leakage including lateral connections.
 - .18 Locate and repair defects if leakage is greater than amount specified.
 - .19 Repeat test until leakage is within specified allowance for full length of water main.

3.10 PIPE SURROUND

- .1 Upon completion of pipe laying and after Consultant has inspected Work in place, surround and cover pipes as indicated.
- .2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .3 Place layers uniformly and simultaneously on each side of pipe.
- .4 Do not place material in frozen condition.
- .5 Compact each layer from pipe invert to underside of backfill in accordance with OPSS 501. Compact granular material to 98% SPMDD.

3.11 BACKFILL

- .1 Do backfilling in accordance with Section 31 00 00.01 Earthwork and Related Work.

3.12 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations: witnessed by Engineer and Plumbing Inspector.
 - .1 Notify Consultant at least 4 days in advance of proposed date when disinfecting operations will begin.
- .2 Flushing and disinfection shall comply with OPSS 441, MOECC Watermain Disinfection Procedure.

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- .3 Access points for chlorination shall be within 3 metres of all dead ends, in accordance with AWWA 651.
 - .4 New main work shall be physically separated from existing distribution system until after disinfection of new work. Physical separation may include a gap space, an approved backflow prevention device (AWWA Standard C651), or blind flange but not a closed distribution valve.
 - .5 Make temporary provisions as necessary to provide for minimum scouring velocity of 0.76 metres/sec. If flushing velocities cannot be achieved (large mains), alternate methods may be utilized in accordance with AWWA Standard C651 if approved by the Contract Administrator.
 - .6 The Contractor is advised, that results for bacteriological testing typically require 72 hours.
 - .7 Bacteriological sampling shall be in accordance with AWWA Standard C651.
 - .8 Swab all watermain pipe and fittings, not subject to flushing and disinfection, with chlorine solution with 50 mg/liter chlorine concentration, prior to installation.
 - .9 Discharge chlorinated water to sanitary sewers where available. Dechlorinate all superchlorinated water. De-chlorinate water, if chlorine residual is not otherwise eliminated, before discharge to a watercourse.
 - .10 Make provisions through blow offs or flushing to maintain water quality within the existing distribution system at locations created by isolation for the new work.

3.13 SURFACE RESTORATION

- .1 After installing and backfilling over water mains, restore surface to original condition as indicated.

3.14 QUALITY CONTROL

- .1 The Proponent shall retain the services of a consulting firm with CCIL Certified Lab Type-C designation for Quality Control testing of materials and compaction of backfill.
- .2 Quality Control test results shall be used for the acceptance of aggregates, except when referee testing has been carried out. Quality Control sampling and testing shall be in accordance with OPSS 1010. Two sets of samples for each granular material will be required for Gradation Requirements. The Consultant will randomly select when samples are to be collected.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify Consultant.
- .4 Contractor to conduct Quality Control (QC) density testing to ensure granular materials are compacted according to the requirements.
- .5 Contractor shall submit QC density test records to Contract Administrator and owner using the field compaction report provided in OPSS 501 Appendix B or other approved form.

- .6 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 00 00.01 Earthwork and Related Work.

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C104/A21.4, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - .2 AWWA C901-17, Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service
- .2 CSA Group (CSA)
 - .1 CSA B137.1-13, Polyethylene (PE) Pipe, Tubing, and Fittings for Cold Water Pressure Services [Part of B137 Series-05, Thermoplastic Pressure Piping Compendium]
- .3 Ontario Provincial Standard Specifications (OPSS). All OPSS references shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial oriented specification is specified in the Contract Documents.
 - .1 OPSS 407 Nov 2021 – Construction Specification for New Maintenance Hole, Catch Basin, Ditch Inlet, and Valve Chamber Installation
 - .2 OPSS 412 Nov 2018 – Construction Specification for Force main Installation in Open Cut.
 - .3 OPSS 450 Nov 2021 – Construction Specification for Pipeline and Utility Installation in Soil by Horizontal Directional Drilling
 - .4 OPSS 501 Nov 2017 – Construction Specification for Compacting
 - .5 OPSS 1010 Nov 2013 - Material Specification for Aggregates-Base, Subbase, Select Subgrade, and Backfill Material.

1.3 SUBMITTALS

- .1 Pipe certification on pipe.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit manufacturer's instructions, printed product literature and data sheets for heat trace include product characteristics, performance criteria, physical size, finish and limitations.

1.4 SCHEDULE OF WORK

- .1 Schedule Work to minimize interruptions to the existing building.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Polyethylene pressure pipes to CSA B137:
 - .1 Type: 50mm Diameter HDPE DR 17,
 - .2 Joints: thermal butt fusion or insert or compression type fittings that are recommended by the pipe manufacturer and that prevent pull out and resist creep deformation at full test pressure.
 - .3 Polyethylene fittings: to CSA B137, for pipe sizes 4" and less.
- .2 Pipe Insulation:
 - .1 Extruded Polystyrene Rigid Insulation – Owens Corning Foamular C-300 or approved equivalent.
- .3 Tracer Wire:
 - .1 Fourteen (14) gauge TW solid copper light coloured plastic coated tracer wire

2.2 PIPE BEDDING AND SURROUND MATERIALS

- .1 Tank bedding and surround material shall be Granular B with a max aggregate size of 26.5 mm supplied in accordance with OPSS 1010.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Consultant.
 - .2 Remove defective materials from site as directed by Consultant.

3.2 TRENCHING

- .1 Trench in locations indicated on contract drawings.
- .2 Do trenching Work, in accordance with Section 31 00 00.01 Earthwork and Related Work.
- .3 Trench depth to provide cover over pipe of not less than 3.0 m from finished grade.
- .4 Trench alignment and depth require Consultant's approval prior to placing bedding material and pipe.

3.3 HORIZONTAL DIRECTIONAL DRILLING

- .1 Directional drill in locations indicated on contract drawings.
- .2 Directional drill depth to provide cover over pipe of not less than 3.0 m from finished grade.
- .3 Trench alignment and depth require Consultant's approval prior to placing bedding

3.4 GRANULAR BEDDING

- .1 Place granular bedding in unfrozen condition.

- .2 Place 150 mm of compacted granular bedding material.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 98% SPMDD
- .6 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material

3.5 INSTALLATION

- .1 In directional drill locations, install pipe in accordance with OPSS 450
- .2 Lay and join pipes in accordance with OPSS 412.
- .3 Avoid damage to machined ends of pipes in handling and moving pipe.
- .4 Maintain grade and alignment of pipes.
- .5 Align pipes carefully before jointing.
- .6 Joint deflection permitted within limits in accordance with pipe manufacturer's written recommendations.
- .7 Support pipe firmly over entire length, except for clearance necessary at couplings.
 - .1 Do not use blocks to support pipe.
- .8 Keep pipe and pipe joints free from foreign material.
- .9 Avoid bumping gasket and knocking it out of position, or contaminating with dirt or other foreign material. Remove disturbed gaskets clean, lubricate and replace before jointing is attempted.
- .10 Support pipes using hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
- .11 Apply sufficient pressure in making joint to ensure that joint is complete to manufacturer's recommendations.
- .12 Apply restraint to pipe to ensure that joints when completed are held in place, by tamping fill material under and alongside pipe.
- .13 When stoppage of Work occurs, block pipe as directed by using a removable watertight bulkhead installed at the open end of the last pipe laid whenever work is suspended.
- .14 Install rigid insulation around force main in locations where cover is less than 3.0m.
- .15 Tie sanitary forcemain into existing maintenance hole as indicated on contract drawings. Connection as per OPSS 407. Ensure water tight seal.

3.6 THRUST BLOCKS

- .1 Restrain bends, tees and fittings using concrete thrust blocks.
- .2 Keep pipe couplings free of concrete.

3.7 HYDROSTATIC AND LEAKAGE TESTING

- .1 Do tests in accordance with OPSS 412

3.8 PIPE SURROUND

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
- .3 Hand place surround material in uniform layers simultaneously on each side of pipe not exceeding 150mm compacted thickness.
- .4 Compact each layer from pipe to underside of backfill in accordance with OPSS 501. Compact to 98% SPMDD.

3.9 BACKFILL

- .1 Place Backfilling in accordance with Section 31 00 00.01 – Earthwork and Related Work.

3.10 QUALITY CONTROL

- .1 The Contractor shall retain a consulting firm with a CCIL Certified Lab Type -C designation for Quality Control testing of materials and compaction of aggregates.
- .2 Quality Control test results shall be used for the acceptance of aggregates, except when referee testing has been carried out. Quality Control sampling and testing shall be in accordance with OPSS 1010. Two sets of samples for each granular material will be required for Gradation Requirements.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify Consultant.
- .4 Contractor to conduct Quality Control (QC) density testing to ensure granular materials are compacted according to the requirements.
- .5 Contractor shall submit QC density test records to Contract Administrator and owner using the field compaction report provided in OPSS 501 Appendix B or other approved form.
- .6 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)/American Water Works Association (AWWA)
 - .1 ANSI/AWWA C500-[09], Metal-Seated Gate Valves for Water Supply Service (Includes Addendum C500a-95).
 - .2 ANSI/AWWA C504-[10], Rubber-Seated Butterfly Valves.
 - .3 ANSI/AWWA C508-[09], Swing-Check Valves for Waterworks Service, 2 inch (50 mm) through 24 inch (600 mm) NPS.
- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS.Muni 501 Nov 2017 – Construction Specification for Compacting
 - .2 OPSS.Muni 1010 Nov 2013, Material Specification For Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.2 SCHEDULING

- .1 Schedule work to minimize interruptions to existing services.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide the following:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sewage lift station and pipes. Include product characteristics, performance criteria, pump data, physical size, finish and limitations.
 - .2 Submit shop drawings for packaged sewage lift station and components.

1.4 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: Provide operation and maintenance data for sewage lift station for incorporation into manual.
- .2 Include information as follows:
 - .1 Record drawings, wiring diagrams, electrical schematics of equipment as installed.
 - .2 Interconnections with numbers and wire sizes.
 - .3 Certified pump characteristic curves.
 - .4 Detailed operation and maintenance instructions.
 - .5 Parts list comprising complete schedule clearly identified to facilitate re-ordering.

2.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect septic tanks from damage.
 - .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Sewage lift station:
 - .1 Liberty Pumps factory assembled duplex grinder pump package model D3696LSG203-72 with AE34=4-511 panel or approved equivalent.

2.2 PUMP LIFTING SYSTEM

- .1 Ensure pumps are complete with sliding guide and brackets, chains and quick leak-proof disconnect to discharge piping, all allowing for withdrawal of pumps.
- .2 Include galvanized lifting chain or stainless steel cable for each pump accessible from access hatches.
- .3 Use galvanized steel pipe as quick rails for pump.

2.3 PUMP CONTROL SYSTEM

- .1 Liquid level switches: mercury-free switches enclosed in leak-proof polypropylene body.
- .2 Include independently adjustable control levels as follows:
 - .1 Off level.
 - .2 Lead pump start level.
 - .3 High water alarm.
 - .4 Lag pump start level.
- .3 Ensure lead pump and lag pump controls include alternator relay to provide automatic pump alteration for each pumping cycle when pump sequence selection switch is on automatic.

2.4 ELECTRICAL CONTROL PANEL AND WIRING

- .1 Use only CSA approved components.
- .2 Electrical equipment in station in accordance with requirements for Hazardous Locations, Class 1, Group D, Division 2.
- .3 Panel enclosure to be NEMA 4Xweather proof of fabricated steel suitably braced, double door equipped with locking device, suitable for wall mounting.
- .4 Ensure panel is complete with required components including:
 - .1 Circuit breaker for each pump.
 - .2 Magnetic motor contactor for each pump.
 - .3 Dry contacts, normally open, on high water alarm relay for remote indication.
 - .4 Pump mode selector switches for hands-off-automatic operation of each pump.
 - .5 Pump sequence selector switch to permit override of automatic pump alternation and selection of either pump to run as lead pump.
 - .6 Red LED alarm beacon and alarm horn.
 - .7 Ground connection lug.
- .5 Labels: all components on and inside panel to indicate operating routine.
- .6 Schematic wiring diagram: mounted inside panel door, varnish protected.

- .7 Panel must be compatible the specified pumps.

2.5 PACKAGE SYSTEM

- .1 Precast concrete or fiberglass enclosure complete with components specified.

2.6 TANK BEDDING AND SURROUND MATERIAL

- .1 Tank bedding and surround material shall be Granular B with a max aggregate size of 26.5 mm supplied in accordance with OPSS 1010.

2.7 RIGID INSULATION

- .1 100mm Extruded polystyrene rigid insulation shall have a minimum compressive strength of 275KPa.

2.8 SOURCE QUALITY CONTROL

- .1 Perform operational tests on pumps at factory to check for excessive vibration, for leaks in piping or seals and for correct operation of automatic control system and auxiliary equipment. Pump suction and discharge lines to be coupled to reservoir and pumps to recirculate water for minimum of [1] our under simulated service conditions.
- .2 Provide certification that pumps and controls have been factory tested and deficiencies rectified prior to delivery to site.

PART 3 EXECUTION

3.1 EXCAVATION, BACKFILLING AND COMPACTION

- .1 Excavate in accordance with section 31 00 00.01 Earthwork and Related Work.
- .2 Set septic tank on 300 mm minimum of granular B bedding and compact to 98% SPMDD and in accordance with OPSS 501.
- .3 Install rigid insulation around all sides and top of the tank prior to placing surround and backfill material.
- .4 Place surround material in accordance with OPSS 501. Compact surround material to 98% SPMDD.
- .5 Backfill in accordance with section 31 00 00.01 Earthwork and Related Work.

3.2 EQUIPMENT INSTALLATION

- .1 Install equipment, piping and controls in accordance with manufacturers' recommendations.
- .2 Refer to electrical drawings for panel location.

3.3 FIELD QUALITY CONTROL

- .1 After completion of installation, demonstrate functional operation of systems, including sequence of operation, to approval of Consultant.
- .2 Provide labour and ancillary equipment necessary to fulfil tests.
- .3 Test to demonstrate that:

- .1 Pumps and equipment run free from heating, or vibration.
- .2 Operation meets requirements of these specifications.
- .3 Pumps and pumping are free and clear of debris and obstructions.
- .4 Replace equipment found defective.
 - .1 Repeat test until equipment is accepted by Consultant.

3.4 DEMONSTRATION

- .1 Operating Personnel Training
 - .1 Provide on site training by qualified personnel for designated operating personnel prior to final commissioning. Schedule and deliver training in accordance with training plan approved in writing by Consultant.
 - .2 Include training for designated personnel on routine maintenance procedures, minor repairs, replacement of parts, including disassembly of major components.
 - .3 Include safety precaution procedures for systems.
 - .4 appropriate facility.

3.5 QUALITY CONTROL

- .3 The Contractor shall retain a consulting firm with a CCIL Certified Lab Type -C designation for Quality Control testing of materials and compaction of aggregates.
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- .5 Not later than 48 hours before backfilling or filling with approved material, notify Consultant.
- .6 Contractor to conduct Quality Control (QC) density testing to ensure granular materials are compacted according to the requirements.
- .7 Contractor shall submit QC density test records to Contract Administrator and owner using the field compaction report provided in OPSS 501 Appendix B or other approved form.
- .8 Contractor is responsible for all costs associated with testing for QC purposes.

END OF SECTION