S. BURNETT & ASSOCIATES LIMITED
ENGINEERING & ENVIRONMENTAL

REQUEST FOR TENDER

TOWN OF SHELBURNE

FIDDLE PARK UPGRADES

May 2025

SBA File No.: M24017

Closing Date: Wednesday, May 28, 2025

Closing Time: 2:00:00 p.m., Eastern Time

PREPARED FOR:

TOWN OF SHELBURNE

PREPARED BY:

S. BURNETT & ASSOCIATES LIMITED

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210 Broadway, Unit 203 Orangeville, ON L9W 5G4

Index to Contract Documents

Section A

Tender Ad

Town of Shelburne, Fiddle Park Upgrades
Contract No.: M24017

COMPLETED AND FINAL SUBMISSIONS, on forms supplied by the Consulting Engineer, will be received via email to:

info@sbaengineering.com
2:00 p.m. Eastern Time on Wednesday, May 28, 2025

The Tender includes:

- Remove and Cap Existing Watermain;
- Removal and Relocation of Existing Gravel Roads;
- Construction of Main Asphalt Walking Trail;
- Cut/Fill and Grading to Construct Swale and Match Site Grading Plan
- Supply and Place Culverts in Swale
- Prepare Subbase for Playground;
- Asphalt Court Construction;
- Pavilion Upgrades;
- Construction of Tiered Seating Area;
- Construction of Concrete Walkways;
- Construction of Parking Lot;
- Tree Planting;
- Landscaping, Seed and Sod;
- Hydro Pole Relocation and Installation;
- Street Light Installation;
- Supply and Installation of Conduit and Light Posts around Walking Trail;
- Other Electrical Work.

Plans and Tender documents may be obtained from Biddingo and Merx. Bidders must register with Biddingo.com or Merx.com in order to bid.

Interested Bidders shall note that a non-mandatory, but highly recommended, pre-Tender site visit is scheduled on Tuesday, May 20, 2025 commencing at 11:00 a.m. Eastern Time at Fiddle Park, 105 2nd Line, Shelburne, ON L9V 3N4. All inquiries shall be submitted in writing prior to 5:00 p.m. on Wednesday, May 21, 2025 and will be replied to Bidders on or before Friday, May 23, 2025. Written queries regarding this Tender are to be directed to Connor Messner, P.Eng., Civil Engineer at: connor.messner@sbaengineering.com.

Each Tender submission must be accompanied by a certified check or bid bond to be retained by the Consulting Engineer for an amount of at least 10 percent (10%) of the total Tendered price made payable to the Town of Shelburne. This contract is subject to the approval of the Town of Shelburne. The lowest or any Tender will not necessarily be accepted.

Consulting Engineer
S. Burnett & Associates Limited
210 Broadway, Unit 203
Orangeville, ON, L9W 5G4
T: (519) 941-2949

Owner
Town of Shelburne
203 Main Street East
Shelburne, ON L9V 3K7
T: 519-925-2600

Section B

Bidder Information

Table of Contents

1 GENERAL INFORMATION TO BIDDERS

1.1 Location and Scope of Work

The proposed work included in this Contract is located in the Town of Shelburne, located within Dufferin County, at Fiddle Park, 105 2nd Line, Shelburne, Ontario L9V 3N4.

The proposed work primarily involves the supply of all labour, materials and equipment as necessary for the Fiddle Park Upgrades as indicated on the drawings and described herein. All work shall be completed in accordance with the Contract Documents and Drawings.

A Description of Work is listed in Section No. 01007 – General Instructions, of the Supplemental Specifications.

1.2 Contract Approval

This Contract is subject to the approval of the Town of Shelburne.

1.3 Contractors Site Visit

Contractors shall note that a non-mandatory, but highly recommended site visit has been scheduled for 11:00 a.m. Eastern Time on Tuesday, May 20, 2025. The site visit will be held at Fiddle Park, located at 105 2nd Line, Shelburne, ON L9V 3N4.

1.4 Questions / Clarifications

Enquiries regarding this Tender must be submitted to the project coordinator and should be directed to Connor Messner, P.Eng., Civil Engineer at connor.messner@sbaengineering.com. No enquiries are to be directed to any other employee or elected Officials of the Town of Shelburne. Questions will be accepted until 5:00 p.m. on Wednesday, May 21, 2025.

All clarification requests are to be sent in writing to the individual mentioned above. No clarification requests will be accepted by telephone. Responses to clarification requests will be provided in the form of an addendum. All addendums will be provided on or before Friday, May 23, 2025.

Any changes to the Tender, prior to the bid closing will be issued as an addendum. The Town of Shelburne and S. Burnett & Associates Limited will assume no responsibility for oral instruction or suggestions. Failure to acknowledge all addenda will result in your bid being rejected.

All addendum / addenda will be provided via Merx / Biddingo only. It is the Bidders sole responsibility to acknowledge receipt. A bid received without addendum / addenda acknowledgment and/or submitted as instructed will be rejected.

1.5 Delivering and Closing of Tender

Electronic bid submissions of the complete and final Tender Form and Schedule of Unit Prices shall be received by:

info@sbaengineering.com

Submissions shall be provided in PDF format, via email by no later than:

2:00 p.m. Eastern Time on Wednesday, May 28, 2025

Each tender will be marked with the time and date it was received.

The Tender Form must be fully legible, signed and witnessed in the spaces provided, with the signature of the Bidder or a responsible official of the organization bidding.

1.6 Tender Submission

Contractors are to submit their complete Tender Bids electronically at the time and date specified above.

Contractors must submit the Tender Form, including Addenda acknowledgement and any supplementary information upon Closing of the Tender. The Cost Summary Schedule of Unit Prices Form must be submitted upon Closing; however, Schedule pages may be submitted with summary pricing only. ***A full breakdown of pricing must be completed and provided as a "hard copy" submission.***

Contractors are required to submit the "hard copy" of the complete Tender Form package (including certified cheque or bid bond) to the offices of S. Burnett & Associates Limited within two (2) business days (**48 hours)** of the closing date and time on Friday, May 30, before 5:00 p.m. Eastern Time. Failure to provide the "hard copy" submission within the time period will result in disqualification.

The unbound copy of the Tender Form provided with the Tender package shall be submitted in its entirety. All sections of the Tender Form shall be completed.

1.7 Disqualification, Withdrawal and Qualifying Tenders

Under no circumstances will Tenders be considered which:

a. Are received by the Owner (or their authorized representatives) after the closing time on the closing date specified herein.

b. Are not accompanied by the Tender Deposit as specified, if required.

c. Are not accompanied with an Agreement to Bond, if required.

A Bidder who has already submitted a Tender may submit a further Tender at any time up to the official closing time. The last tender received shall supersede all Tenders previously submitted by that Bidder for this Contract. Facsimile transmissions will not be accepted.

A Bidder may withdraw or qualify their Tender at any time up to the official closing time by submitting a letter bearing their signature and seal as their Tender to the point of Tender delivery where the time and date of receipt will be recorded and the letter placed with the other Tenders. Facsimile transmissions will not be accepted.

Tender packages can be download from Biddingo.com or MERX.com. Bidders must be registered with Biddingo.com or MERX.com in order to submit a bid. Bidders not meeting submission criteria are, at the discretion of the Owner, subject to disqualification.

1.8 Informal or Unbalanced Tenders

Tenders which are incomplete, conditional, illegible or obscure, or that contain additions, reservations, erasures, qualifications, alterations or irregularities of any kind may, but will not necessarily, result in the Owner's rejection of the bid.

Tenders that contain prices which appear to be so unbalanced as likely to adversely affect the interests of the Owner may be rejected.

Tenders that are based upon an unreasonable period of time for the completion of the works may be rejected.

Wherever in a Tender the amount Tendered for an item does not agree with the extension of the estimated quantity and the Tendered unit price, the unit price shall govern and the amount and the Total Tender Price shall be corrected accordingly.

The Owner reserves the right to waive formalities at their discretion.

Bidders who have submitted Tenders that have been rejected by the Engineer and/or Owner because of informalities will be notified of the reasons for the rejection within 10 days after the Tender closing date.

1.9 Discrepancies In and Interpretation of Tender Documents

Should a Bidder find discrepancies in, or omission from, the drawings, specifications, or other Tender documents, or should they be in doubt as to their meaning, they should notify the Engineer who may send a written instruction to all Bidders.

No oral interpretation shall be made to a Bidder as to the meaning of any of the Tender documents, or be effective to modify any of the provisions of the Tender documents. Addenda shall be issued by the Engineer to items in the Tender as they determine. Addenda shall be in writing via Merx.com and/or Biddingo.com prior to Tender closing. Email transmissions may be used by the Engineer to issue addenda.

1.10 Acceptance or Rejection of Tenders

The lowest or any Tender will not necessarily be accepted. Tenders will be evaluated to ensure that the Contractor has the appropriate qualifications and experience to complete this project. This evaluation will be based upon the following criteria:

a. Qualifications and related experiences of the Bidder, senior personnel and subcontractors to be assigned to this project.

b. Amount of work to be completed by Bidders own forces versus subcontractors.

c. Performance of the Bidder and subcontractors on past projects, including, without limitation, the Bidder's history with respect to quality of work, scheduling, changes in the work, claims, disputes, level of satisfaction of Owners and Consultants, etc.

d. Price.

e. Conformance with the requirements set forth in the Tender Document.

f. Local labour and equipment to be utilized during construction.

g. Other such considerations as may be determined by the Owner to be in its own best interest.

The Engineer and the Owner reserve the right to reject any Tender from a contractor not meeting these qualifications. Award will then be based on the lowest qualified bid.
The Engineer and the Owner reserve the right to reject any or all Tenders and to waive formalities, as the interests of the Owner may required, without stating reasons thereto.

The Bidder acknowledges that it shall have no claim against, or entitlement to damages from the Owner or the Engineer by reason of the Owner's rejection of its bid or of all bids, or by reason of any delay in the acceptance of a Tender. Tenders are subject to a formal Contract being prepared and executed.

1.11 Tender Deposit and Bonding Requirements

Each Tender shall be accompanied by either:

a. A Tender deposit in the form of a certified cheque made payable to the Owner for an amount equal to at least 10 percent (10%) of the total Tendered price; or,

b. A Bid Bond of at least 10 percent (10%) of the Tendered amount and sealed by a corporation duly authorized to transact the business of Surety slip.

The Bidder shall include with their Tender an Agreement to Bond as per the format of the specimen enclosed in Section B, executed under its corporate seal by the surety company from which they propose to obtain the required bonds. Only bonds issued by insurers licensed in Ontario will be accepted as per the terms and conditions of the Tender documents.

Prior to execution of a contract with the Owner, the Contractor will be required to furnish to the Owner a performance bond in the amount of 100 percent (100%) of the total Tender price and a separate payment bond in the amount of 100 percent (100%) of the total Tender price. The full cost of these bonds is deemed to be included in the total Tender price for the project.

The Tender deposit cheque of two (2) Bidders, as selected by the Owner, will be retained for 60 days or until such time as a Contract has been executed by the Owner and the successful Bidder.

1.12 Formation of Contract

The Engineer, when so instructed by the Owner, shall forward a complete digital copy of the Contract Documents to the successful Bidder for execution via DocuSign.

The Bidder agrees that if they have been notified that their Tender has been recommended to the Owner for acceptance they will fully execute the Articles of Agreement bound in the Contract Documents within 10 days after receiving those same Documents in triplicate.

The successful Bidder shall execute and return with the digitally signed Contract Documents, to the Engineer within 10 days, the following in triplicate:

a. Performance and Labour/ Materials Payment Bonds;

b. Current Clearance Certificate from the Workplace Safety & Insurance Board;

c. Health & Safety Policy;

d. General and Commercial Liability Insurance Certificate as outlined in the General Conditions of Contract;

e. All Risk Insurance Certificate as outlined in the General Conditions of Contract;

f. Other Insurance, as required, as outlined below in Section 1.13; and,

g. A work Schedule outlining the proposed timing of the works.

1.13 Insurance Definitions

1.13.1 Commercial General Liability Insurance

Commercial General Liability, underwritten by an insurer licensed to conduct business in the Province of Ontario for a limit of not less than $5M per occurrence, an aggregate limit of not less than $5M, within any policy year with respect to completed operations, and a deductible of not more than $100,000. This policy shall include but not be limited to:

a. Name the Client as an additional insured

b. Cross-liability and severability of interest

c. Blanket Contractual

d. Products and Completed Operations

e. Premises and Operations Liability

f. Personal Injury Liability

g. Contingent Employers Liability

h. Owners and Contractors Protective

i. Broad Form Property Damage

j. Non-owned automobile liability

k. The policy shall include 30 days' notice of cancellation.

1.13.2 Automobile Liability

Standard Form Automobile Liability Insurance that complies with all requirements of the current legislation of the Province of Ontario, having an inclusive limit of not less than $5M per occurrence for bodily injury, death and damages to property, in respect of the use or operation of vehicles owned, operated or leased by the Contractor.

1.13.3 Environmental Liability (Contractor's Pollution Liability)

The policy should cover financial loss incurred by the insured as a consequence of or resulting from any negligent act, error or omission causing environmental damages. The Contractor shall take out and keep in force with a limit of not less than $2M per incident per occurrence or series of occurrences for bodily injury, death and property damage arising from the spill, discharge, emission, dispersal, seepage, leakage, migration, release or escape of pollutants in the ground,

atmosphere, water course or any body of water caused by or as a result of any negligent act, error and/or omission of the Contractor. Coverage shall include third party bodily injury and property damage including restoration/remediation costs. If such insurance is issued on a claims-made basis, coverage shall contain a 24-month extended reporting period or be maintained for a period of 2 years subsequent to conclusion of services provided under this Agreement. If the policy is to be cancelled or non-renewed for any reason, 30-day notice of said cancellation or non-renewal must be provided to the Client.

1.13.4 Construction Project Insurance

1.13.4.1 Builder's Risk

Contractor shall maintain builder's risk insurance on a 100% completed value basis on the entire work in progress, including materials stored off-site, while in transit or on site preparatory to being incorporated in the Work. The policy shall be written on a full replacement cost basis. The Client shall be named as Additional Insured on Contractor's builder's risk policy. The policy deductible shall not exceed $25,000 unless approved in advance by the Client in its sole discretion. Contractor shall be responsible for payment of claims within the deductible or above the policy limits. Contractor's insurance shall be primary to any builder's risk insurance maintained by the Client at its sole discretion and benefit. Contractor's insurer shall waive any right of subrogation or recovery against the Client.

Such insurance shall be written for not less than the Contract construction cost value covering:

- Builder's Risk
- Personal Property & any tools, equipment, scaffolding, staging, towers, and forms owned or rented by Contractor.

Such insurance shall be written to include the following coverage:

a. Written on an "All Risk" form
b. Insure against loss from perils of fire and physical loss or damage including theft, vandalism, malicious mischief, collapse, sinkhole, flood, and surface water, earthquake, windstorm and demolition and debris removal;
c. Start up and testing;
d. Ensuing loss resulting from faulty workmanship, materials or error in design;
e. Transit and off-site storage;
f. Waiver of Subrogation;
g. $25,000 deductible paid by Contractor;
h. Additional Insured endorsement.

1.13.5 Additional Insurance Clauses

Certificate of Insurance. The Contractor shall provide a Certificate of Insurance evidencing the required coverage before the commencement of services or the supply of goods and shall be required to ensure the coverage is maintained throughout the Term of the Contract. Any claims-made policy needs to be maintained for at least 24 months following termination or expiration of the Agreement.

Additional Insured. At Contractor's sole expense, the Client, its affiliates and each of their respective officers, councillors, directors, agents and employees shall be named as Additional Insureds on a primary basis on all liability policies with the exception of professional liability.

Primary Coverage. The Contractor's insurance shall be primary coverage and not additional to and shall not seek contribution from any other insurance policies available to the Client.

Notice of Cancellation or Changes. Except as otherwise approved by the Client, the policies shall be endorsed to provide the Client with not less than 30 days written notice in advance of any cancellation, change or amendment which restricts coverage such that the Contract requirements are no longer met.

Insurance Not to Affect Other Contract Obligations. Insurance procured by Contractor shall not reduce or limit Contractor's contractual obligation to indemnify and defend the Client as provided in the Contract.

1.14 Subcontractors

The Bidders shall list, on the page provided in Section B, Item 2.3, the name and address of each Subcontractor used in preparing their Tender, stating that portion of the work allotted to each. Only one (1) Subcontractor shall be named for each part of the work to be sublet. After a formal Contract has been executed, the Contractor shall not be permitted to substitute other Subcontractors in place of those named in their Tender without the approval of the Engineer.

1.15 Proof of Ability

The Bidder shall, on the form provided in Section B, Item 2.4, provide proof of their experience and responsibility in successfully completing projects of a similar nature. This proof of ability shall apply in general to the Bidder's experience in similar work.

The Bidder's senior supervisory staff and the experience of each, the Bidder's construction plan, and the name and business address of each proposed Subcontractor will also be provided if so requested within three (3) days of such a request being made by the Engineer.

1.16 Construction Layout

The Contractor is responsible for the layout of all construction works. The Engineer may provide construction control points and benchmarks at the onset of the work. Replacement of the control points removed by the Contractor, subcontractor or suppliers shall be at the Contractor's expense.

1.17 Soils Information

Soils information has not been included in this document.

1.18 Protection of Survey Bars and Monuments

Before commencing construction operations, the Contractor must acquaint himself with the location of all survey bars and monuments located in the area in which their construction operations will be conducted. Should any of the survey bars or monuments be unnecessarily disturbed by the Contractor, as determined by the Engineer, they will be required to reimburse the Owner for the expenditures incurred in restoring all of the survey bars and monuments disturbed. If any survey bars or monuments must be disturbed to complete the proposed works as determined by the Engineer, the Owner will cover the cost to restore. This must be determined prior to disturbing or the Contractor will be responsible.

1.19 Construction Period, Working Days and Liquidated Damages

1.19.1 Working Time Allotment

The Contractor shall complete all works to the point of substantial completion described herein and on the Contract Drawings. It is anticipated that Contract Award will occur May 30, 2025. Therefore, it will be understood that the project working time allotted of 21 weeks will commence following mobilization of equipment and manpower to site by the Contractor based on a start date no later than June 9, 2025. Substantial completion shall be performed by October 31, 2025.

Due to delivery lead times on equipment and materials, Contractors shall provide proof of purchasing and schedules of timelines for equipment by the suppliers within one (1) week of signed Contract Agreement. Contractor is to be held responsible for delays in equipment deliveries that are sensitive to the Commissioning timeline of the project.

1.19.2 Construction Sequencing

The Contractor shall sequence the construction as follows:

- Playground civil work;
- Court civil work;
- Swale grading;
- Remaining work.

The intent is to complete construction in the northwest quadrant of the site to allow for the playground contractor to begin assembly as soon as possible. Once completed, a fence between the playground and the swale shall be in place to allow public use of the playground.

1.19.3 Working Day Extension

If the Contractor is delayed in the completion of the work for causes beyond the reasonable control of the Contractor, as determined by the Engineer, the time of completion shall be extended in writing at any time on such terms and for such period as shall be determined by the Engineer in accordance with OPS General Conditions of Contract.

1.19.4 Liquidated Damages

It is agreed by the parties to the Contract that in case of all work called for under the Contract is not finished or completed as set forth herein, damages will be sustained by the Owner and that it is and will be impractical and extremely difficult to ascertain and determine the actual damage which the Owner will sustain by reason of such delay and the parties hereto agree that the Contractor will pay to the Owner the sum of $2,500 plus all costs for Engineering fees and expenses with respect to inspection, Contract Administration and related works for the liquidated damages for each and every calendar day delay in finishing the work in excess of the number of working days prescribed or the completion date specified and it is agreed that this amount is an estimate of the actual damage.

The Owner may deduct any amount due under this paragraph from any monies that may be due or payable to the Contractor on any account whatsoever. The liquidated damages payable under this paragraph are in addition to and without prejudice to any other remedy, action or other alternative that may be available to the Owner.

1.20 Preliminary Acceptance, Guaranteed Maintenance Period, Final Acceptance and Release of Holdback

1.20.1 General

For the purposes of this contract, Preliminary Acceptance and Substantial Completion will be assumed to have the same meaning except as distinguished in Section 1.20.2.

It is intended that the Contractor guarantee to the Owner under normal operating conditions the work included in this Contract for a period of time as further described in Section 1.20.4, however, under no circumstances shall the Guaranteed Maintenance Period be less than 12 months from the date of Preliminary Acceptance. Preliminary Acceptance is defined as the date that all services, as required by the Engineer, have been tested, cleaned, inspection and approved by the Owner's Engineer and the Town of Shelburne. For the purpose of this Contract, Preliminary Acceptance shall not be granted prior to:

1. The work or a substantial part thereof is ready for use or is being used for the purpose intended; and,
2. When the work remaining to be done under the Contract is capable of completion or correction at a cost of not more than:
    i. 3 percent (3%) of the first $1,000,000 of the Contract price;
    ii. 2 percent (2%) of the next $1,000,000 of the Contract price; and,
    iii. 1 percent (1%) of the balance of the Contract price.

For the purpose of this Contract where the work or substantial part thereof is ready for use or is being used for the purpose intended and/or where the work cannot be completed expeditiously for reasons beyond the Control of the Contractor, the value of the work to be completed shall be deducted from the Contract price in determining the works remaining to be done under the Contract and at the discretion of the Engineer and Owner, Preliminary Acceptance may be granted. Similarly, if the Owner is not prepared to grant their Preliminary Acceptance, then at the discretion of the Owner and Engineer, Substantial Completion for the purposes of maintenance periods and holdbacks reduction may be granted to the Contractor for the work completed to date. The Owner reserves the right in the above cases to institute an independent maintenance period and associated holdback for work remaining to be completed under the Contract.

1.20.2 Procedure for Preliminary Acceptance

Following the completion of the works included in this Contract and when the works have satisfactorily passed all tests required under the Contract, the Engineer and the Owner will undertake a preliminary inspection. The Contractor shall, when required, clean all services and provide any assistance and equipment required for this inspection. Upon completion of any

repairs or incomplete work by the Contractor, the Contractor will reapply for Preliminary Acceptance. Provided that no serious deficiencies exist in the completed work the Engineer will then declare a date for Preliminary Acceptance.

1.20.3 Release of Holdback

The 12 percent (12%) holdback shall be paid to the Contractor per the terms of the *Construction Lien Act* and as follows:

1. 10 percent (10%) (less the value of any deficient work), after the expiration of 60 days from the date of advertisement of the Certificate of Substantial Performance.
2. 2 percent (2%) at the termination of the Guaranteed Maintenance Period subsequent to satisfactory recertification of deficiencies as determined by the Engineer.

Upon Substantial Performance and written request from the Contractor, the Engineer will provide a Certificate of Substantial Performance. The Contractor shall publish a copy of the certificate once in a Construction Trade Newspaper, which shall include:

i. The name and address for the service of the Owner and of the Contractor.
ii. The name and address of the payment certifier, where there is one.
iii. A short description of the improvement.
iv. The date on which the Contract was substantially performed.
v. Where the lien attaches to the premises, a concise description containing a reference to lot and plan or instrument registration number sufficient to identify the premises; and/or, where the lien does not attach to the premises, a statement of where the lien notice must be delivered to preserve lien rights and.
vi. The street address, if any, of the premises.

Prior to the first release of reduction of holdback, the Contractor shall within 15 days of the date of the date of advertisement of the Certificate of Substantial Performance:

a. Submit a statutory declaration in a form satisfactory to the Engineer that all liabilities incurred by the Contractor and their Subcontractors in carrying out the Contract have been paid and that there are no liens, garnishments, attachments or claims relating to the work.
b. Submit a satisfactory clearance certificate from the Workplace Safety & Insurance Board.
c. Submit proof of publication of the Certificate of Substantial Performance.
d. Submit a release in a form satisfactory to the Engineer releasing the Owner from all further claims relating to the Contract, qualified by stated exceptions such as outstanding work or

matters arising out of subsection GC3.13 of the General Conditions; Claims, Negotiations, Mediation.

e. Submit a written statement as to the status of deficient and outstanding works complete with a schedule with respect to completion of these works.

1.20.4 Period of Guaranteed Maintenance

The Contractor shall be responsible for correcting any deficiencies, which occur due to defective material or faulty workmanship for a period of 12 months from Substantial Performance. Refer to General Conditions of Contract.

The Contractor shall maintain the required bonding in full force and effect until the date of Final Acceptance.

1.20.5 Procedure for Final Acceptance

Prior to Final Acceptance, the Engineer, together with the Contractor, the Owner and the Owner's Engineering Representative shall inspect the services. The Contractor shall, where required, clean all services and provide any assistance and equipment required for this inspection.

1.20.6 Release and Final Documentation

Following the Owner's Final Acceptance and prior to releasing the Contractor from their responsibility, obligation or liability under the Contract, the Contractor shall submit the following documents:

1. Contractor's final claim.
2. A release by the Contractor in a form satisfactory to the Engineer releasing the Owner from all further claims relating to the Contract.

Upon receipt of the foregoing documents, a release duly executed by the Owner shall be issued. This will release the Contractor and their surety or sureties from any term or provisions of, or any responsibility, obligation or liability under this Contract.

1.21 Harmonized Sales Tax (HST)

Bidders should prepare their proposals to include the current tax system which will be in place throughout the life of the Contract on the understanding that, once the transitional provisions are available, the Contract price will be adjusted, if necessary, so that the tax impact of the change is neutral to the Contractor, after taking into account the portion of the work affected by the change, any Input Credits received by the Contractor, and all other relevant factors, following the implementation of the Harmonized Sales Tax regime. In the event of any dispute between the

parties concerning the necessary adjustment, the matter will be finally resolved by an independent audit firm acceptable to both parties.

1.22 Traffic and Pedestrian Control

The Contractor shall provide adequate control of traffic while operating equipment on municipal and highway road allowances. The Contractor will be required to maintain traffic flow and pedestrian flow at all times. The Contractor shall leave the work each night so that access is available to all driveways, roads and entrances. It shall be the Contractor's responsibility to notify all emergency services, if such notification is required, as a result of the work under the Contract.

The Contractor shall take special note that these sections shall be amended to read that the Contractor shall also pay for signing, and construction and maintenance of detours.

The Contractor shall be responsible for adequate fencing of any excavations overnight and on holidays, and shall provide adequate lights and barricades as per safety requirements and additionally as may be required in the opinion of the Engineer.

Further to the requirements of the General Conditions of the Contract, the Contractor shall meet the requirements of Ontario Traffic Manual – Book 7 (Temporary Conditions) including, but not limited to, preparation of a Traffic Control Plan and a Traffic Protection Plan. Book 7 shall govern traffic control.

1.23 Co-operation with Other Contractors

No additional payment will be made for provisions necessary to work around other Contractors.

1.24 Local Specifications

The work proposed under this Contract, and the materials to be used shall comply in every respect to the specifications and standards of the local municipal authority. Supervision of construction of the proposed works may be provided by the local authority's regulations with respect to notification prior to commencing work.

Each Bidder shall satisfy themselves by personal examination as to the local conditions, requirements and specifications. They are not to claim at any time after submission of their Tender that there was any misunderstanding as to the requirements of the local municipal authority with respect to the proposed works.

1.25 Dispute Resolution

Disputes between the Owner and the Contractor not otherwise resolved may be settled through Binding Arbitration, with an arbitrator experienced in engineering, construction and contractual

law, as per Section GC3.14 of the OPS General Conditions, or through other means agreed upon by both parties.

1.26 Existing Services

Before commencing work, establish location and extent of existing services in area of work and notify the Engineer of findings.

Whenever it is necessary to cut, interfere with, and/or connect to an existing services or facility, do so at hours and times recommended by governing authorities and approved by the Engineer; and with minimum disturbance to occupants, pedestrian and vehicular traffic and public and private property.

Submit schedule to and obtain approval from the Engineer for each proposed shutdown of active service of facility. Adhere to approved schedule and provide notice to affected parties.

If unknown services are encountered, immediately notify the Engineer and confirm findings in writing and/or on drawings. Obtain the Engineer's written direction if such services require cutting, capping or relocation to do work.

The Engineer has endeavoured to plot on the Contract Drawings known existing utilities, pipes, catch basins, conduits, poles, chambers or other objects, being located underground, on the surface, or above ground; but should be plotting of such be found to be incorrect, incomplete or omitted, the Contractor shall have no claim on that account.

It is the duty of the Contractor to notify all local utilities requesting the staking or marking of cable, conduit, watermains, etc., before the start of construction. The Contractor shall be solely responsible for damages or disturbance caused to any utility, pipe or object listed in the preceding paragraph.

Throughout the execution of the works included in the Contract, the Contractor shall ensure that the necessary steps are taken to maintain the flow and use of the existing services except as otherwise herein specified and shall be responsible for all service and utility lines disturbed.

The Contractor shall pay for all costs associated with providing temporary bracing of poles necessary to complete work under this Contract. The Contractor shall have no claim for the delay sustained while waiting for the relocation or repair of services by other forces, as a result of the Contractor's work. Any such relocation deemed to be completed by others may be undertaken prior to the Contractor's work on the site, however, those which have not been completed or which are not originally foreseen as a problem shall be the Contractor's responsibility to the extent of contacting the utilities involved and sustaining their own work and forces under the

Contract. The Owner shall bear the direct relocation cost charges resulting from the Contract work.

1.27 General Instructions

The General Information to Bidders should be read in conjunction with Section 01007 of the specifications, if applicable.

1.28 Equivalents or Approved Equals

Where pursuant to the Specifications, the Contractor is required to supply an article or group of related articles designated by a trade or other name or an "approved equal", the Tender shall be based only upon supplying the article of quality required by the Specification. After the acceptance of a Tender, the Contractor may apply to the Engineer to substitute as an approved equal another article or group of related articles identified by a different trade or other name for an article or group of related articles designated as aforesaid. The application shall be in writing and shall state the price for the proposed substitute article or group of related articles, the price for the article or group of articles designated as foresaid and such other information as the Engineer may require.

No ruling on a proposed substitution will be made prior to the acceptance of a Tender. No substitution shall be made without the prior approval of the Engineer. The approval or rejection of a proposed substitution shall be at the sole discretion of the Engineer and their decision shall be final.

1.29 Occupational Health & Safety Act

a. The Contractor, for the purposes of the Ontario Occupational *Health and Safety Act*, shall be designated as the Constructor for this project and shall assume all of the responsibilities of the Constructor as set out in the Act and its regulations. The foregoing shall apply notwithstanding that the successful Bidder has been referred to as the "Contractor" in this and any other related document.

    i. The Contractor acknowledges that they have read and understood the *Occupational Health and Safety Act* (R.S.O. 1990), as amended).

    ii. The Contractor agrees to observe strictly and faithfully the provisions of the said *Occupational Health and Safety Act.*

    iii. The Contractor agrees to indemnify and save the Owner harmless for damages or fines arising from any breach or breaches of the said *Occupational Health and Safety Act.*

    iv. The Contractor agrees to assume full responsibility for the enforcement of the said *Occupational Health and Safety Act* to ensure compliance therewith.

v. The Contractor further acknowledges and agrees that any breach or breaches of the *Occupational Health and Safety Act* whether by the Contractor or any of its Subcontractors may result in the immediate termination of this contract herein and the forfeiture of all sums owing to the Contractor by the Owner.

vi. The Contractor agrees that any damages or fines may be assessed against the Owner by reason of a breach or breaches of the *Occupational Health and Safety Act* by the Contractor or any of its Subcontractors will entitle the Owner to set-off the damages so assessed against any monies that the Owner may, from time to time, owe the Contractor under this contract or under any other contract whatsoever.

b. The Contractor shall provide a list of all controlled hazardous materials or products containing hazardous materials, all physical agents or devices or equipment producing or emitting physical agent that is deemed to be or contains a designated substance as defined under the Ontario Occupational Health & Safety Act, and shall provide appropriate Material Safety Data Sheets for these substances used for the performance of the required work, all prior to the performance of said work.

c. Where hazardous materials, physical agents and/or designated substances are used in the performance of the required work, the Contractor shall ensure that the requirements of the Ontario Occupational Health & Safety Act and associated regulations are complied with.

d. Contractors are to abide by Community Health & Safety policies. Upon successful award, the Contractor must provide H&S policy documentation.

1.30 Pandemic Policy

In the event of a pandemic (e.g., COVID-19), as declared by the Province of Ontario, the conditions below shall apply to this Contract:

i. Every effort shall be made in which to continue the Work as specified within this Contract. Contractors are advised to follow federal and provincial public health guidelines and measures if a pandemic is declared. Social distancing practices and wearing of any Personal Protective Equipment (PPE) related to pandemic protection (e.g., face masks, etc.), as necessary, during site visits, upon visiting or working in the Community may be enforced. In extreme cases, proof of vaccination against transmissible viruses and/or antigen testing (rapid tests) may be required. Pandemic policy enforcement is at the discretion of the Community.

ii. Should circumstances arise due to a pandemic which significantly prevent the Contractor's ability to perform and/or complete the Work, to a degree which, in the sole judgement of the Contract Administrator (in consultation with the Owner and the Contractor), renders continuation of the Work substantially inefficient or impractical

and/or completion of the Work impossible, then the Owner may suspend the Work or terminate the Contract, as appropriate under said circumstances.

1.31 OPS General Conditions of Contract

The Ontario Provincial Standard Specifications Municipal-Oriented General Conditions of Contract, November 2024 (OPSS.MUNI 100) shall apply to this Contract. These documents are available at the following URL, under the tab Vol. 7-8 OPSS (Municipal), OPSS.MUNI 100, MUNI General Conditions of Contract:

https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/opsViews.aspx?lang=en-US

The General Conditions, as referenced above, are hereby incorporated into, and apply, mutatis mutandis, to this Contract. It will be the Contractor's responsibility to obtain current copies of the OPS General Conditions.

1.32 Amendments to OPS General Conditions of Contract

All the requirements of the General Conditions of Contract, shall apply to this Contract with the following exceptions:

a. The reference to "Contract Administrator" shall be deemed to be the duly appointed member of S. Burnett & Associates Limited.

b. The 12 percent (12%) holdback shall be paid to the Contractor per the terms of the *Construction Lien Act* and as follows:

   i. 10 percent (10%) (less the value of any deficient work) after the expiration of 60 days from the date of advertisement of the Certificate of Substantial Performance; and,

   ii. 2 percent (2%) at the termination of the Guaranteed Maintenance Period.

c. Subsection GC 1.04 shall be revised in that a Major Item will constitute only those items with a value equal to or greater than 20 percent (20%) of the total Tender value.

d. All references in Section B.3, General Conditions of Contract, to the Corporation shall be construed as referring to the Owner.

e. The Contractor is required to provide All Risk Insurance as per GC6.03.05.01.01. All insurance shall include the Owner (Town of Shelburne), Engineer (S. Burnett & Associates Limited), and all affected Municipalities as co-insureds.

f. Payment for equipment for extra work undertaken on a time and material basis (Subsection GC 8.02.05 shall be at 80 percent (80%) of OPSS 127 rates regardless of the total cost of the extra work item and regardless of whether the equipment is owned / leased by the Contractor or rental equipment.

g. Further to Subsection GC8.02.04.11, the Owner reserves the right to retain up to two (2) times the estimated value of deficient work at any time from monies owing to the Contractor until such deficient work is satisfactorily rectified.

h. Further to Subsection GC8.02.05.08, where the Contractor arranges for additional work to be performed by a subcontractor based upon a pre-approved lump sum price, the Owner will pay the subcontractor's lump sum price plus a mark-up calculated on the following basis:

   i. 10 percent (10%) of the first $5,000 plus;

   ii. 5 percent (5%) of the amount in excess of $5,000.

1.33 Seasonal Roadway Load Restrictions

Seasonal road restrictions imposed on Municipal and Provincial roads may affect cost for transporting of equipment and materials the construction site (such as granulars, concrete, rebar reinforcement, etc.).

The Contractor is responsible for determining any road load size restrictions which may be applicable during the construction period and which may affect the load capacity of any truck using such roads. The Ministry of Transportation, local authorities having jurisdiction and Owner shall be contacted in this regard. The Contractor will not be compensated for any additional costs incurred due to any load restrictions after the Contract is awarded.

1.34 Supporting Documentation Disclaimer

Bidders are to note that all documentation provided in the attached Appendices is for reference only. Bidders shall satisfy themselves concerning the correctness of the information and shall do their own investigation of any and all services before commencing the work, if awarded. The Engineer, S. Burnett & Associates Limited, is not responsible for any damages or delays of the Work performed due to the information provided in the supporting documentation. No responsibility will be accepted by the Engineer or Owner for the correctness of any of the information given in the document.

2 TENDER FORM

2.1 Tender Submission

Town of Shelburne, Fiddle Park Upgrades
Contract No.: M24017

To: **Town of Shelburne**

This Tender is submitted by:

_____
Firm Name

_____
Address

_____
Telephone Number

_____
Email Address

I, _____
Authorized Agent

Of _____
Company Represented
(hereinafter referred to as the "Bidder")

Having carefully examined the locality and site of the proposed works, and all Contract Documents relating thereto, including the Tender Ad, Tender Form, Specifications, Appendices, General Conditions of Contract, Schedule of Unit Prices, Standard Specifications and Drawings, **Addenda ___ to ____ inclusive**, do hereby submit an offer in accordance with the Contract Documents and all location specifications, including detailed drawings as may be supplied from time to time, to furnish all materials, labour, tools, plant, matters and all things necessary within the time specified as described in the following Sections.

The undersigned agrees to accept as full payment therefore, the sums calculated in accordance with the actual measured quantities at the unit prices set forth in Schedule of Unit Prices herein.

The Bidder also agrees:

1. That, this Tender is made by the Bidder without any connection, knowledge, comparison of figures, or arrangement with any other person or persons making a Bid for the same work and is in all respects fair and without collusion or fraud.

2. That, this offer is to continue open to acceptance until the Contract is executed by the successful Bidder or for a period of 60 days commencing from the Date of Closing of Tenders, whichever event first occurs and that the Owner may, at any time within that Period accept this Tender whether any other Tender has been previously accepted or not.

3. That the Owner may reject any or all Tenders without explanation.

4. That, they will carry out any additional or extra work (including the supplying of any additional materials or equipment pertaining thereto) or will delete any work as may be required by the Engineer in accordance with the Contract.

   That, the carrying out of any work referred to above or the issuance by the Engineer of a Contract Change Order relating to such work or the acceptance by the Bidder of such Contract Change Order shall not, except as expressly stated in such Contract Change Order, waive or impair any of the terms of the Contract or of any Contract Change Order previously issued by the Engineer or any of the rights of the Owner or of the Engineer under the Contract.

5. That, they will complete the works within the time period allotted.

6. That, failure by the Contractor to complete the entire work within said time or the extended time allowed by the Engineer will give the Owner the right to collect liquidated damages including additional engineering costs as spelled out in Section 1.19.4 from the Contractor for each day thereafter until the work is completed as specified. Said liquidated damages are not a penalty, but are the agreed damages which the Owner would suffer if the work were incomplete at the end of the time proposed in this Statement, with allowed extensions of time, if any.

7. That, if the Bidder withdraws this Tender before the Owner shall have considered the Tenders and awarded the Contract in respect thereof, at any time not later than 60 days after the Tender closing date, the amount of the deposit accompanying this Tender shall be forfeited to the Owner or the bid bond shall be enforced.

8. That, the awarding of the Contract by the Owner based on this Tender, shall constitute acceptance of this Tender.

9. That, if this Tender is accepted, to furnish approved Surety Bonds for the proper fulfillment of the Contract as required and to execute the Contract documents, in triplicate, within 10 days after being notified to do so. In the event of default or failure on the part of the Bidder to do so, the Bidder agrees that the Owner shall be at liberty to retain the Tender Deposit for the use of the Owner and to accept the next lowest or any Tender or to advertise for new Tenders, or to carry out the works in any other way they deem best.

10. This Tender Form comprises of:

    2.1 Tender Submission
    2.2. Tender Agreement
    2.3. List of Proposed Subcontractors
    2.4. Bidder's Experience in Similar Completed Work
    2.5. Bidder's Client and Consultant References in Similar Completed Work
    2.6. Ontario Provincial Standard Drawings (OPSD)
    2.7. Ontario Provincial Standard Specifications (OPSS)
    2.8. Contract Drawings
    2.9. Schedule of Unit Prices
    2.10. Cost Summary Schedule of Unit Prices
    2.11. Bid Bond and Agreement to Bond

2.2 Tender Agreement

That, this Tender is submitted by:

Firm Name

Address

Telephone Number

Email Address

The Bidder solemnly declares that the several matters stated in the foregoing Tender are in all respects true.

Signature and Seal of Bidder

President/Signature and Seal

Witness

Date of Submission

2.3 List of Proposed Subcontractors

The General Information to Bidders requires the Bidder to list on this statement sheet the name of each proposed subcontractor. Listed hereunder are the names of all subcontractors, concrete ready-mix supplier, precast concrete supplier, building material supplier, etc., as applicable whom the Bidder proposes to use:

Sub-Trade	Proposed Subcontractor	Address	Approximate Value of Sublet Work

2.4 Bidder's Experience in Similar Completed Work

Location	Owner's Engineer	Description of Contract	Completion Date	Value ($)

2.5 Bidder's Client and Consultant References in Similar Completed Work

(Minimum 3 References Required)

Project	Completion Date	Owner	Consultant	Contact Information

Ontario Provincial Standard Drawings (OPSD)

It will be the Contractor's responsibility to obtain current copies of the Ontario Provincial Standard Drawings as listed below, which form part of this Contact.

OPSD	204.010 (Nov 2015) - Boulder Treatment, Cut Sections – Subgrade
OPSD	216.021 (Nov 2017) - Subdrain Pipe, Connection and Outlet, Urban Section
OPSD	219.110 (Nov 2021) – Light-Duty Silt Fence Barrier
OPSD	220.010 (Nov 2019) - Barrier for Tree Protection
OPSD	310.010 (Nov 2019) - Concrete Sidewalk
OPSD	310.020 (Nov 2019) - Concrete Sidewalk Adjacent to Curb and Gutter
OPSD	310.040 (Nov 2019) - Utility Isolation in Concrete Sidewalks
OPSD	310.050 (Nov 2019) - Concrete Sidewalk Driveway Entrance Details
OPSD	600.110 (Nov 2012) - Concrete Barrier Curb
OPSD	802.030 (Nov 2015) - Rigid Pipe Bedding, Cover, and Backfill, Type 1 or 2 Soil – Earth Excavation
OPSD	802.031 (Nov 2015) - Rigid Pipe Bedding, Cover, and Backfill, Type 3 Soil – Earth Excavation
OPSD	802.032 (Nov 2015) - Rigid Pipe Bedding, Cover, and Backfill, Type 4 Soil – Earth Excavation
OPSD	802.033 (Nov 2015) - Rigid Pipe Bedding, Cover, and Backfill – Rock Excavation
OPSD	803.030 (Nov 2015) – Frost Treatment – Pipe Culverts Frost Penetration Line Below Bedding Grade
OPSD	803.031 (Nov 2015) – Frost Treatment – Pipe Culverts Frost Penetration Line Between Top of Pipe and Bedding Grade
OPSD	805.010 (Nov 2018) - Height of Fill Table Round Corrugated Steel Pipe and Structural Plate Corrugated Steel Pipe
OPSD	972.132 (Nov 2012) – Fence, Chain-Link Details and Table
OPSD	989.110 (Apr 2019) - Small Sign Support System, SQR-LOC Perforated Steel Square Sign Post System, Installation – Single Post Assembly
OPSD	1101.020 (Nov 2018) – Valve Operator
OPSD	1103.010 (Nov 2018) – Concrete Thrust Blocks for Tees, Plugs, and Horizontal Bends
OPSD	1104.010 (Nov 2018) - Water Service Connection, 19 and 25 mm Diameter Sizes
OPSD	1104.020 (Nov 2018) – Water Service Connection, 32, 38, and 50mm Diameter Sizes
OPSD	1109.011 (Nov 2020) - Cathodic Protection for PVC Watermain Systems
OPSD	1109.012 (Nov 2020) - Cathodic Protection of Existing Metallic Watermains, Exposed Service or Pipe Method
OPSD	1109.030 (Nov 2020) – Insulation For Sewers and Watermains In Shallow Trenches
OPSD	2101.01 (Apr 2024) – Duct Installation in Trenches

2.6 Ontario Provincial Standard Specifications (OPSS)

It will be the Contractor's responsibility to obtain current copies of the Ontario Provincial Standard Specification Forms as listed below, which form part of this Contact.

MUNI.100 (Nov. 2024)	MUNI.405 (Nov. 2017)	MUNI.602 (Nov. 2017)	MUNI.1541 (Apr. 2019)
MUNI.102 (Nov. 2018)	MUNI.407 (Nov. 2021)	MUNI.603 (Nov. 2024)	MUNI.1801 (Nov. 2019)
MUNI.106 (Apr. 2023)	MUNI.408 (Nov. 2021)	MUNI.604 (Nov. 2017)	MUNI.1841 (Nov. 2019)
MUNI.120 (Nov. 2019)	MUNI.409 (Nov. 2023)	MUNI.609 (Nov. 2019)	MUNI.1842 (Nov. 2020)
PROV.127 (Apr. 2024)	MUNI.410 (Nov. 2018)	MUNI.614 (Nov. 2019)	MUNI.1850 (Nov. 2020)
MUNI.180 (Nov. 2021)	MUNI.411 (Nov. 2021)	MUNI.615 (Nov. 2022)	MUNI.1853 (Nov. 2018)
MUNI.182 (Nov. 2021)	MUNI.412 (Nov. 2018)	MUNI.616 (Apr. 2018)	MUNI.1860 (Nov. 2018)
MUNI.201 (Apr. 2019)	MUNI.421 (Nov. 2018)	MUNI.703 (Apr. 2019)	MUNI.2401 (Nov. 2019)
MUNI.202 (Nov. 2022)	MUNI.441 (Nov. 2021)	MUNI.706 (Apr. 2018)	Mutatis Mutandis
MUNI.203 (Nov. 2019)	MUNI.442 (Nov. 2020)	MUNI.772 (Apr. 2019)	
MUNI.206 (Apr. 2019)	MUNI.450 (Nov. 2021)	MUNI.801 (Nov. 2019)	
MUNI.301 (Nov. 2018)	MUNI.460 (Nov. 2018)	MUNI.802 (Nov. 2019)	
MUNI.310 (Nov. 2017)	MUNI.490 (Nov. 2020)	MUNI.803 (Apr. 2018)	
MUNI.311 (Nov. 2018)	MUNI.491 (Nov. 2017)	MUNI.804 (Nov. 2014)	
MUNI.314 (Nov. 2023)	MUNI.492 (Nov. 2020)	MUNI.805 (Nov. 2021)	
MUNI.351 (Nov. 2021)	MUNI.501 (Nov. 2017)	MUNI.902 (Nov. 2021)	
MUNI.353 (Nov. 2021)	MUNI.506 (Nov. 2017)	MUNI.903 (Nov. 2020)	
MUNI.401 (Nov. 2024)	MUNI.510 (Nov. 2018)	MUNI.904 (Nov. 2023)	
MUNI.402 (Nov. 2024)	MUNI.511 (Nov. 2019)	MUNI.905 (Nov. 2017)	
MUNI.403 (Nov. 2023)	MUNI.517 (Nov. 2021)	MUNI.1351 (Nov. 2024)	
MUNI.404 (Nov. 2017)	MUNI.518 (Apr. 2017)	MUNI.1359 (Nov. 2016)	

2.7 Contract Drawings

The work to be done under this Contract is shown on the Contract Drawings and are made a part of this Contract. A list of drawings in their entirety can be found in Section F. Contract drawings are included as a separate document. Additional drawings showing details in accordance with which the work is to be constructed may be furnished from time to time by the Engineer, if found necessary, to supplement or supersede the drawings hereto attached and such additional drawings shall thereupon become a part of this Contract.

The Contractor shall be governed by the figured dimensions, as given on the drawings.

Where required dimensions are not shown in figures, the Contractor shall obtain the said dimensions from the Engineer before proceeding with the construction of the portion of the work to which they refer.

In every case, detailed drawings shall take precedence over general drawings. In no instance shall dimensions be scaled from drawings.

2.8 Schedule of Unit Prices

1. Where alternative materials are specified, the Contractor shall bid a Unit Price for each alternative, but shall extend only the lowest unit price.
2.

cu.m	Denotes	Cubic Metre (1,000 litres)
m(v)	Denotes	Vertical Metre
m(l)	Denotes	Linear Metre
LS	Denotes	Lump Sum
EA	Denotes	Each
sq.m	Denotes	Square Metre
CSP	Denotes	Corrugated Steel Pipe
t	Denotes	Tonne (2,204.6 lbs)
cu.m(c)	Denotes	Compacted Cubic Metres
ha	Denotes	Hectare
hrs	Denotes	Hours

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Page No. 28

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE A - Miscellaneous Items

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
A1	Mobilization / Demobilization	1.00	LS		
A2	Bonding & Insurance				
a)	Bonding	1.00	LS		
b)	All-Risk Insurance	1.00	LS		
A3	Supply and Maintain Contractor Site Office	1.00	LS		
A4	Allowances:				
a)	Hydro One	1.00	LS	***$15,000.00***	***$15,000.00***
b)	Soils, Concrete, & Asphalt Testing	1.00	LS	***$25,000.00***	***$25,000.00***
c)	ESA Inspection & Permits	1.00	LS	***$1,500.00***	***$1,500.00***
A5	Environmental Mitigation Measures	1.00	LS		
A6	Utility Location & Construction Layout	1.00	LS		
A7	Supply, Erect and Maintain Signs and Traffic Control Devices and Maintain Traffic Flow	1.00	LS		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE B - Site Works

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
B1	Remove and Cap Existing Watermain	245.00	m(l)		
B2	Water Service Work				
a)	Removal of Existing Curbstop, Riser, Service Line, and Post	6.00	Ea.		
b)	Relocate Curbstop and Water Service to Water Bottle Fill Location	1.00	Ea.		
c)	Supply and Installation of Water Bottle Fill Station	1.00	Ea.		
B3	Removal of Existing Gravel Roads (Total 3,677 sq.m) and Relocation to the Proposed Parking Lot				
a)	Granular Material Removal and Relocation (Assumed 450 mm depth)	1,655.00	cu.m		
b)	Net Fill	1,655.00	cu.m		
B4	Grouting of Existing 100 mm dia. PVC Sewage Dumping Opening in Manhole	1.00	Ea.		
B5	Construct Main Walking Path (1600 sq.m)				
a)	Supply, Place, and Compact Granular B (300 mm depth)	480.00	cu.m		
b)	Supply, Place, and Compact Granular A (150 mm depth)	240.00	cu.m		
c)	Supply, Place, and Compact Hot Mix Asphalt HL3 (75 mm depth)	120.00	cu.m		
B6	***Provisional:*** Construct Parking Lot at Existing Building (900 sq.m)				
a)	Supply, Place, and Compact Granular B (300 mm depth)	270.00	cu.m		
b)	Supply, Place, and Compact Granular A (150 mm depth)	135.00	cu.m		
c)	Supply, Place, and Compact Hot Mix Asphalt HL3 (75 mm depth)	67.50	cu.m		
B7	Cut/Fill and Grading to Construct Swale and Match Site Grading Plan				
a)	Swale Construction (Net Fill)	200.00	cu.m		
b)	Site Grading (Net Fill)	6,000.00	cu.m		
B8	Supply and Place Culverts in Swale				
a)	400 mm dia. CSP (9 m length)	3.00	Ea.		
b)	Supply and Installation of Rip-Rap with Terrafix 270 Geofabric Underlay Around Culvert Ends at Swale Crossings	290.00	sq.m		
B9	Supply and Installation of Rigid Box Insulation **(0.6m x 2.4m x 50mm Thick Rigid Sheets)**				
a)	Over Watermain in Swale	14.40	sq.m		
b)	Under Concrete Walkway in Front of Pavilion	108.00	sq.m		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE B - Site Works CONT'D

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
B10	Playground Area Civil Work (393 sq.m)				
a)	Supply, Place, and Compact Granular A (150 mm depth)	58.95	cu.m		
b)	Supply, Place, and Compact 19mm Clear Stone (200 mm depth)	78.60	cu.m		
c)	Supply and Place 150 mm dia. Drainage Tile	144.00	m(l)		
d)	Supply and Installation of Dry Well (Clear Stone, Flo-Well, Valve Box)	1.00	LS		
B11	Asphalt Court Construction (395 sq.m)				
a)	Supply, Place, and Compact 19mm Clear Stone (200 mm depth)	79.00	cu.m		
b)	Supply, Place, and Compact Granular A (150 mm depth)	59.25	cu.m		
c)	Supply, Place, and Compact Hot Mix Asphalt HL3 (75 mm depth)	29.63	cu.m		
d)	Supply and Place 150 mm dia. Drainage Tile	105.00	m(l)		
B12	150 mm dia. Drainage Tile around Tiered Seating Area Draining to Swale	207.00	m(l)		
B13	Supply and Installation of Metal Soffit Ceiling within Pavilion	570.00	sq.m		
B14	Pavilion Column Modifications:				
a)	Two (2) Column Concrete Footings and Reinforcement	1.00	LS		
b)	Two (2) Columns (HSS 127mm X 127mm x 7.9mm W/ 3/4" THK X 254mm X 254mm Base Plate & Four (4) 5/8" DIA. HILTI HAS-V-36 Adhesive Anchor Bolts)	1.00	LS		
c)	One (1) Steel Beam (W690X140 + Two (2) Sill Plates on Top with Two (2) 1/2" Bolts @ 610mm)	1.00	LS		
B15	Construct Asphalt Laneway at Pavilion (405 sq.m)				
a)	Supply, Place, and Compact Granular B (300 mm depth)	121.50	cu.m		
b)	Supply, Place, and Compact Granular A (150 mm depth)	60.75	cu.m		
c)	Supply, Place, and Compact Hot Mix Asphalt HL3 (75 mm depth)	30.38	cu.m		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE C - Electrical Work

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
C1	Supply and Install 20ft Direct Buried Concrete Poles	1.00	Ea.		
C2	Relocate 20ft direct buried concrete Poles	4.00	Ea.		
C3	Supply and install 16ft base mounted poles, decorative arm and 15W decorative luminaire	18.00	Ea.		
C4	Supply and install 26ft base mounted poles, decorative arm and 100W luminaire	3.00	Ea.		
C5	Supply and install 6ft x 6in x 6in wood post	1.00	Ea.		
C6	Supply and install 1.8m mast arms	12.00	Ea.		
C7	Supply and install conduit for lighting including trenching, sand bedding and backfill (1-53mm dia. Per circuit)	840.00	m(l)		
C8	Supply and install conduit for future use including trenching, sand bedding and backfill (1-103mm dia.)	540.00	m(l)		
C9	Supply and install conduit for sound tent receptacles including trenching, sand bedding and backfill (3-53mm dia.)	75.00	m(l)		
C10	Supply and install conduit for sound tent pulling station including trenching, sand bedding and backfill (2-153mm dia.)	40.00	m(l)		
C11	Supply and install lighting cable including terminations, fuses, fuse holders and riser cable within pole (2C#6AWG)	840.00	m(l)		
C12	Supply and install receptacle cable including terminations (2C#4AWG)	75.00	m(l)		
C13	Supply and install street lighting cable aerial including terminations, fuses, fuse holders and riser cable within pole (3C#6AWG)	275.00	m(l)		
C14	Supply and install wall pack lighting cable including terminations, fuses, fuse holders (2C#8AWG)	85.00	m(l)		
C15	Supply and install 9mm messenger cable aerial	275.00	m(l)		
C16	Supply and install ground wire (1C#6AWG Cu)	840.00	m(l)		
C17	Supply and install ground wire (1C#8awg Cu)	165.00	m(l)		
C18	Supply and install ground rods	5.00	Ea.		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE C - Electrical Work CONT'D

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
C19	Supply and install 50w LED luminaire	19.00	Ea.		
C20	Supply and install 77w LED wallpack luminaire	7.00	Ea.		
C21	Supply and install grade level box 514mm	5.00	Ea.		
C22	Supply and install decorative concrete pole base	21.00	Ea.		
C23	Supply and install 20A duplex GFI receptacle c/w weatherproof enclosure	3.00	Ea.		
C24	Modifications to existing Panels including breakers, cables and any sundry equipment	1.00	LS		
C25	CCTV Junction box c/w GFI receptacle	1.00	Ea.		
C26	Pathway Lighting Control Panel	1.00	Ea.		
C27	Removal of electrical equipment	1.00	LS		
C28	Testing & commissioning	1.00	LS		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE D - Landscaping

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
D1	Trees:				
a)	Picea glauca – 250cm Ht. WB	10.00	Ea.		
b)	Pinus strobus – 250cm Ht. WB	10.00	Ea.		
c)	Larix laricina – 250cm Ht. WB	3.00	Ea.		
d)	Thuja occidentalis – 250cm Ht. WB	12.00	Ea.		
e)	Acer rubrum – 70mm Cal. WB	5.00	Ea.		
f)	Acer saccharinum – 70mm Cal. WB	3.00	Ea.		
g)	Acer saccharum – 70mm Cal. WB	12.00	Ea.		
h)	Acer saccharum 'Legacy' – 70mm Cal. WB	3.00	Ea.		
i)	Acer x freemanii 'Jeffersred' – 70mm Cal. WB	10.00	Ea.		
j)	Amelanchier laevis 'Spring Flurry' – 70mm Cal. WB	6.00	Ea.		
k)	Betula alleghaniensis – 70mm Cal. WB	7.00	Ea.		
l)	Betula papyrifera – 70mm Cal. WB	6.00	Ea.		
m)	Carya cordiformis – 70mm Cal. WB	3.00	Ea.		
n)	Fagus grandifolia – 70mm Cal. WB	8.00	Ea.		
o)	Gymnocladus dioicus – 70mm Cal. WB	10.00	Ea.		
p)	Ostrya virginiana – 70mm Cal. WB	5.00	Ea.		
q)	Prunus serotina – 70mm Cal. WB	10.00	Ea.		
r)	Quercus macrocarpa – 50mm Cal. WB	3.00	Ea.		
s)	Quercus palustris – 70mm Cal. WB	15.00	Ea.		
t)	Quercus rubra – 70mm Cal. WB	9.00	Ea.		
u)	Salix amygdaloides – 70mm Cal. WB	3.00	Ea.		
v)	Tilia americana – 70mm Cal. WB	10.00	Ea.		
D2	Shrubs:				
a)	Cornus serica 'Arctic Fire' – 60cm ht.	45.00	Ea.		
b)	Ilex verticillate – 60cm ht.	6.00	Ea.		
c)	Physocarpus opulifolius – 60cm ht.	6.00	Ea.		
d)	Symphoricarpos albus – 60cm ht.	46.00	Ea.		
e)	Viburnum lentago – 60cm ht.	6.00	Ea.		
D3	Soil/Mulch/Sod				
a)	Trees - Planting medium as per specifications	138.00	cu.m		
b)	Trees - Shredded bark mulch as per drawings and specifications	27.50	cu.m		
c)	Seed mix A as per drawings and specifications	21930.00	sq.m		
d)	Plant Beds - Planting medium as per specifications	100.00	cu.m		
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE D - Landscaping CONT'D

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
D3	Soil/Mulch/Sod CONT'D				
e)	Plant Beds - Shredded bark mulch as per drawings and specifications	22.00	cu.m		
f)	Sod as per drawings and specifications	3630.00	sq.m		
g)	Seed mix B as per drawings and specifications	2650.00	sq.m		
D4	Site Fencing:				
a)	***Provisional:*** Wood Privacy Fence	14.00	m(l)		
b)	Chainlink Fence at Basketball Court	42.00	m(l)		
D5	Paving:				
a)	Concrete Paving (incl. stair landings)	2280.00	sq.m.		
b)	P.I.P. Concrete Pads for Benches	55.00	sq.m.		
c)	Basketball Court Line Painting	1.00	LS		
D6	Features:				
a)	Armourstone, Parking Barrier	74.00	Ea.		
b)	Armourstone, Tiered Seating	300.00	m(l)		
c)	Armourstone, Trail Markers	5.00	Ea.		
d)	Concrete Steps	18.00	m(l)		
e)	Natural Stone Steps c/w Rockery	12.50	m(l)		
f)	Railings	40.00	m(l)		
g)	Concrete Curb, Playground	109.00	m(l)		
h)	Concrete Curb, Bench Pads	30.00	m(l)		
D7	Furnishings:				
a)	Picnic Table (P1)	6.00	Ea.		
b)	Picnic Table - Accessible (P2)	3.00	Ea.		
c)	Bench Type L	2.00	Ea.		
d)	Bench Type R	4.00	Ea.		
e)	Backless Bench	4.00	Ea.		
f)	Bike Rack	5.00	Ea.		
g)	Waste Receptacle	6.00	Ea.		
h)	Basketball Nets, Posts and Footings (2 Total)	1.00	LS		
i)	Tactile Indicator Plates (600x600mm)	30.00	Ea.		
D8	Maintenance Allowance:				
a)	2 Year Maintenance for all plant materials and beds per specifications-Phase 3	1.00	LS	***$3,000.00***	***$3,000.00***
				SUBTOTAL:	

SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited

Project No. M24017

Contractor:

Address:

Contract Title: Town of Shelburne, Fiddle Park Upgrades

SCHEDULE E - Contingencies

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	CONTRACT TOTAL
E1	Supply & Place Additional Material:				
a)	Granular "A"	1,000	cu.m		
b)	Granular "B"	1,000	cu.m		
c)	19 mm dia. Clear Stone	500	cu.m		
d)	Extra Engineered Fill	1,500	cu.m		
E2	Rock Excavation and Removal of Boulders over 1.0 metre in Diameter:				
a)	Boulder Rock (Over 1.0 m Dia.)	200	cu.m.		
b)	Trench Rock	100	cu.m.		
E3	Supply and Installation of Rip-Rap with Terrafix 270 Geofabric Underlay	100	sq.m.		
E4	Supply and Installation of Rigid Box Insulation ***(0.6m x 2.4m x 50mm Thick Rigid Sheets)***	30	sq.m.		
				SUBTOTAL:	

2.9 Cost Summary Schedule of Unit Prices

COST SUMMARY
SCHEDULE OF UNIT PRICES

S. Burnett & Associates Limited **Project No: M24017**

Contractor:
Address:
Contract Title: Town of Shelburne, Fiddle Park Upgrades

DESCRIPTION	CONTRACT TOTAL
SCHEDULE A: Miscellaneous Items	$
SCHEDULE B: Site Works	$
SCHEDULE B: Site Works CONT'D	$
SCHEDULE C: Electrical Work	$
SCHEDULE C: Electrical Work CONT'D	$
SCHEDULE D: Landscaping	$
SCHEDULE D: Landscaping CONT'D	$
SCHEDULE E: Contingencies	$

SUBTOTAL: **$** _____
HST 13%: **$** _____
TOTAL: **$** _____

Estimated Cost of Material to be incorporated in the work: $ _____
Estimated Cost of Labour and all Other Charges: $ _____
Total (Must Equal Total Tender Price): **$** _____

A certified cheque or Bid Bond for the sum of: $ _____ is enclosed.
(Minimum of $)

2.10 Bid Bond and Agreement to Bond

(EXAMPLE)
BID BOND
$

No.

KNOW ALL MEN BY THESE PRESENTS, that

as Principal, hereinafter called Principal, and
as Surety, hereinafter called Surety, are held and firmly bound unto
as Obligee, hereinafter called Obligee, in the full and just sum of _____ Dollars ($) lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED, SEALED AND DATED this _____ day of _____, 20____.

WHEREAS, the Principal has submitted a written Tender to the Obligee, dated the _____ day of _____, 20_____ for

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall have the said Tender accepted within sixty days from the closing date of the Tender call and shall enter into a contract with the Obligee and furnish a Performance Bond and a Labour and Material Payment Bond each in the amount of 100% of the contract and satisfactory to the Obligee or other acceptable security, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that the Surety shall not be (a) liable for a greater sum than the specified penalty of this bond nor (b) liable for a greater sum than the difference between the amount of the Principal's Tender and the amount of the Tender that is accepted by the Obligee nor (c) subject to any suit or action unless such suit or action is instituted and process therefor served upon the Surety at its Head Office in Canada, within twelve months from the date of this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and year first above written.

Name of Contracting Company (Co. Seal)	Name of Bonding Company (Co. Seal)
Signature	Signature

(EXAMPLE)

AGREEMENT TO BOND

We, the undersigned, hereby agree to become bound as Surety for

in a Performance Bond in an amount equal to 100% of the total Tender price and a Payment Bond in an amount equal to 100% of the Contract amount, and conforming to the instruments of Contract attached hereto, for the full and due performance of the works shown as described herein if the Tender for: _____ is accepted by the Owner.

It is a condition of this Agreement that if the above-mentioned Tender is accepted, application for a Performance and Payment Bond must be completed with the undersigned within 15 days of acceptance of the Tender related thereto, otherwise this Agreement shall be null and void.

DATED this _____ day of _____, 20____.

Name of Contracting Company	Name of Bonding Company
for Contracting Co. (Seal)	Signature of Authorized Person Signing for Bonding Company (Seal)
Position	Position

Section C

Articles of Agreement

Articles of Agreement

THIS AGREEMENT made the <day> day of <Month> , 20XX .

BY AND BETWEEN:

"Contractor's Name"

(herein and throughout the Contract Documents called the "Contractor")

and

Town of Shelburne

(herein and throughout the Contract Documents called the "Owner")

WITNESSETH
That the Owner and the Contractor in consideration of the fulfillment of their respective promises and obligations herein set forth covenant and agree with each other as follows:

ARTICLE I

a. This Agreement applies to the supply of all labour, materials and equipment necessary for the construction of works indicated on the Contract Drawings and described in the Contract Documents for the Town of Shelburne, Fiddle Park Upgrades.

b. This Agreement, together with all Sections, Drawings, and Appendices of the Contract Documents constitute the "Contract" and are to be read herewith and form part of the Contract as fully and completely to all intents and purposes as through all the stipulations thereof had been embodied herein.

c. That the date from which this Contract is to be in force is the <day> day of <Month> , 20XX .

d. Three (3) copies of the Contract have been signed for identification by both parties, which copies have been prepared by S. Burnett & Associates Limited, 210 Broadway, Unit 203, Orangeville, Ontario, L9W 5G4 acting as, and herein (and throughout the Contract) entitled the "Engineer".

ARTICLE II

THE CONTRACTOR UNDERTAKES AND AGREES:

a. To do all the work and furnish all the labour, materials, tools, plant, appliances and transportation necessary or proper for the performing and completing of the work required under this Agreement, as set forth in the plans and specifications and in the manner and within the time specified in Section B: Bidder Information, Section 1.19, Construction Period, Working Days and Liquidated Damages.

   The said plans and specifications are intended to cover and provide for proper completed work in all respects, and everything necessary to carry out this intent which may reasonably be implied from the plans and specifications must be done by the Contractor, even if not particularly referred to in the plans and specifications.

b. To complete the work described in this Contract within the allotted time schedule.

   All requests for extensions of said completion dates shall be by registered mail to the Owner and the decision of the Engineer with respect to such requests is to be considered final and binding upon the Contractor and the Owner.

c. The Contractor shall guarantee the work free from any defects in materials and workmanship under normal operating conditions throughout the Period of Guaranteed Maintenance as defined in Section B: Bidder Information, Section 1.20, Preliminary Acceptance, Guaranteed Maintenance Period, Final Acceptance and Release of Holdback.

d. The decision of the Engineer is to be final and binding on the Contractor and the Owner as to the nature and cause of any imperfections and as to the remedy required for each and as to which party shall bear the cost of such remedy. Failure to comply with the directions of the Engineer within 48 hours after written notice may result in the Engineer having the work performed by others and the cost thereof being deducted from the amount due to the Contractor.

e. To furnish the following articles to validate this Contract:

   i. 100% Performance Bond and 100% Labour and Material Payment Bond.
   ii. Evidence of Liability and All Risk Insurance as per General Conditions of Contract in GC6, and following Section B2.
   iii. Current Clearance Certificate from Workplace Safety & Insurance Board.
   iv. Health & Safety Policy documentation.

f. To furnish the items listed in Section 1.20 of Section B Bidder Information, prior to Release of Holdback and following the Owner's Final Acceptance of the work and prior to the Contractor being released from their responsibility.

ARTICLE III

THE OWNER UNDERTAKES AND AGREES:

a. To provide the Contractor with access to and use of their lands and premises to such extent as may be necessary for the continuous and unrestricted prosecution of the Contractor's operation.

b. That the Contractor shall receive payment for work done, and materials supplied according to the unit prices contained in the Tender Form, in accordance with the provisions of this Contract. The unit prices will be applied by the Engineer to the actual quantities of work and materials supplied by the Contractor whether these quantities be more or less than those estimated on the said Tender Form or shown on the Contract Drawings.

c. That the Contractor shall receive payments monthly, or one (1) payment the month following completion of the work should the said work be completed in one (1) calendar month or less, at the rate of 88 percent (88%) of the work actually done and materials in place, according to the estimate of the Engineer, less all forfeitures and deductions provided for in the Contract. These payments shall be authorized on Contract Payment Certificates issued by the Engineer, which will be based upon approximate estimates only, and must not be construed as an acceptance of the work so estimated or as an admission of liability by the Owner in respect thereof.

Within 60 days following the date of preliminary acceptance, when all the work has been substantially completed in accordance with the Contract, a Substantial Performance Payment Certificate will be issued by the Engineer at the rate of 98 percent (98%) of the whole amount due under this Contract.

Within 30 days following the date of Final Acceptance, a Completion Payment Certificate will be issued by the Engineer for the balance of contract funds, including remaining 2 percent (2%) Warranty Holdback amount, due to the Contractor.

ARTICLE IV

All communications in writing between the parties, or between them and the Engineer, shall be deemed to have been received by the addressee:

.1 if delivered personally, on the day that it was delivered;
.2 if forwarded by mail, on the day it was received if earlier, or the sixth day after it was mailed;
.3 if forwarded by facsimile or electronic mail (e-mail), 24 hours after it was transmitted;
.4 if sent by prepaid registered mail and will be considered having been so given on the second next business day after deposit thereof in the post office.

If addressed to the party to whom it is intended at the address in the Contract or at the last address of which the sender has received written notice in accordance with this Section:

The Contractor at:	"Contractor Name" Address "City, Province, Postal"
And to the Owner at:	Town of Shelburne 203 Main Street East Shelburne, ON L9V 3K7
And to the Engineer at:	S. Burnett & Associates Limited 210 Broadway, Unit 203 Orangeville, ON L9W 5G4

ARTICLE V

This Agreement shall ensure to the benefit of and be binding upon the parties hereto and their respective successors, executors, administrators and assigns.

IN WITNESS WHEREOF the Contractor and the Owner have respectively affixed their corporate seals and the hands of their proper officers on or about the day and year first above written.

"Contractor's Name"

Contractor

For the Contractor / Signature & Seal

Date Signed

Town of Shelburne

Owner

For the Owner / Signature & Seal

Date Signed

S. Burnett & Associates Limited

Engineer

Witness

Date Signed

Section D

Special Provisions

Special Provisions
Table of Contents

1. GENERAL REQUIREMENTS

1.1 The following Specifications apply specifically to the individual items of work listed in Section A, B, and E: Schedule of Unit Prices. The purpose of these Special Provisions is to list the work which shall be performed or to infer beyond reasonable doubt the work, which is required, under the items in Schedule A: Miscellaneous, Schedule B: Site Work, and Schedule E: Contingencies.

The prices bid for all work included within all the Schedules, unless otherwise directed in the following specifications, shall be compensation in full for the complete supply of all labour, equipment and materials necessary to construct the work as specified in, shown on, or is reasonably inferable from, the Contract Specifications and Drawings.

1.2 The quantities shown for the items in Schedule A: Miscellaneous, Schedule B: Site Work, and Schedule E: Contingencies are approximate only and subject to the stipulation of the General Conditions, are for the purpose of indicating to Bidders the general magnitude of the work and for comparison of Proposals received. Bidders shall prepare their Proposals with the foregoing in mind and ensure that overhead and other fixed costs are realistically apportioned amongst the items.

1.3 The site of which the work is to be performed is located within the Town of Shelburne. The Contractor and their forces shall maintain an appropriate and cooperative manner in the town at all times. Response to staff's concern or issue must be addressed by the Contractor in a timely manner and fully resolved within five (5) working days.

1.4 The Township maintains the right to remove any person from the site for inappropriate behaviour or violation of laws.

2. SCHEDULE A: MISCELLANEOUS

Item A1: Mobilization / Demobilization

The Contractor shall enter a lump sum amount for mobilization and demobilization, as well as for additional labour, equipment or materials required to complete the Contract but not specifically covered by or related to the other items in the Schedule of Items and Prices. Payment shall be full compensation for all the work necessary to carry out the following works:

- Mobilization (all costs associated with full mobilization to site for the duration of the project).
- Providing an initial construction schedule and updating monthly.
- Completing a pre-construction photo record.
- On-site washroom facilities.

- Site Meetings with the Contract Administrator and Town of Shelburne, as required.
- Site clean-up including removal of debris and construction materials.
- Demobilization: All costs associated with full demobilization from site following successful completion of project.

Basis of Payment

Partial payments will be made on the following basis:

- 60% upon mobilization, providing an initial construction schedule to the satisfaction of the Contract Administrator.
- 40% upon satisfactory site clean-up and demobilization to the satisfaction of the Contract Administrator.

Item A2 a) & b): Bonding & Insurance Requirements

The lump sum price bid for this Item shall be full compensation for providing all bonds and insurance as specified in Section B: Bidder Information, within the Contract Document.

Basis of Payment

One hundred percent (100%) of the price bid for this Item will be paid on the first payment certificate, subject to proof of Contractor issuance of bonding and insurances.

Item A3: Supply and Maintain Contractor's Site Office

Concurrent with mobilization the Contractor shall provide a Contractor site office per the requirements outlined in Section 01593: Engineer & Contractor Site Office.

Basis of Payment

Payment for this Item shall be pro-rated over the length of the construction period proportionate to the value of work completed relative to the total estimated value of the Contract.

Item A4: Allowances

a) Hydro One Allowance

This cash allowance is intended to cover all electrical connection costs with Hydro One.

Should testing results indicate deficient work, the Contractor shall pay for costs associated with any additional testing as required by the Engineer to verify acceptability of work.

Basis of Payment

Hydro One will invoice the General Contractor on a monthly basis, for connection work that has been approved by the Engineer.

Portions of the allowance listed will only be paid to the Contractor when there is evidence that the Contractor has paid the Hydro One. The Contractor shall not be eligible for any markup on any invoiced amounts.

b) Soils, Concrete, & Asphalt Testing Allowance

This cash allowance is intended to cover all materials testing as deemed necessary by the Engineer for this project. The Engineer will coordinate all required testing for soils, concrete, and asphalt with the geotechnical consultants.

Should testing results indicate deficient work, the Contractor shall pay for costs associated with any additional testing as required by the Engineer to verify acceptability of work.

Basis of Payment

The geotechnical consultant will invoice the General Contractor on a monthly basis, for material testing that has been completed and approved by the Engineer.

Portions of the allowance listed will only be paid to the Contractor when there is evidence that the Contractor has paid the geotechnical consultant. The Contractor shall not be eligible for any markup on any invoiced amounts from the geotechnical consultant.

c) ESA Inspection & Permits Allowance

This cash allowance is intended to cover all inspection and permit costs for the electrical work within this project. The Engineer will coordinate all required inspections and permits with the Electrical Safety Authority (ESA).

Should testing results indicate deficient work, the Contractor shall pay for costs associated with any additional inspections or permits as required by the Engineer to verify acceptability of work.

Basis of Payment

The ESA will invoice the General Contractor for inspections and permits.

Portions of the allowance listed will only be paid to the Contractor when there is evidence that the Contractor has paid the ESA. The Contractor shall not be eligible for any markup on any invoiced amounts from the ESA.

Item A5: Environmental Mitigation Measures

The Contractor shall take all reasonable precautions to prevent silt release from entering any waterway. These precautions shall include, but not be limited to, silt fences around stockpiled earth and topsoil, pump discharges onto grass flats, rock flow check dams and sediment traps. The Contractor shall also ensure all water discharged to the environment is dechlorinated using methods approved by the Engineer. All measures shall be in accordance with the standard details provided herein. Upon completion of the work, accumulated silt and debris shall be removed from the site along with the silt trap and sediment fence.

Basis of Payment

Payment for this Item shall be pro-rated over the length of the construction period proportionate to the value of work completed relative to the total estimated value of the Contract.

Item A6: Utility Location & Construction Layout

The lump sum price bid for this Item shall be compensation in full for all labour, equipment and materials required by the Contractor for all utility locations and construction layout of elevations and alignment of the proposed work in accordance with accepted survey procedures. Using qualified personnel and following accepted engineering practices, the Contractor shall calculate, layout, establish and maintain all lines and grades necessary for the construction and verification of the work. They shall provide such information on the calculations, layout, lines and grades at the request of the Contract Administrator. The Contractor shall coordinate on-site construction locates.

Basis of Payment

Payment for this Item shall be pro-rated over the length of the construction period proportionate to the value of work completed relative to the total estimated value of the Contract.

Item A7: Supply, Erect & Maintain Signs and Traffic Control Devices, and Maintain Traffic Flow

Under this Item, the Contractor shall be responsible for the supply, erection and maintenance of signs, barriers, traffic control and coordination within the Town of Shelburne during construction.

Payment for this Item, including full compensation for all labour, equipment, materials required to achieve the specifications of this Item, shall be on a lump sum basis.

The Contractor shall provide and maintain signs, fencing and barriers to prohibit the public, including pedestrians from entering the specified construction areas. All damages arising from insufficient protection of the site will be wholly the responsibility of the Contractor.

All traffic control / protection measures shall be inspected and maintained daily during construction.

If, in the opinion of the Contract Administrator or Town of Shelburne, proper traffic control is not maintained within the Town of Shelburne, the Contractor shall immediately modify the operation to the satisfaction of the Contract Administrator. If the Contractor fails to take immediate action, the Contract Administrator may take such action, as they consider necessary and/or required, and deduct the cost from monies owing to the Contractor. The performance of such work under the direction of the Contract Administrator shall in no way relieve the Contractor from any responsibility or damages that may occur during the performance of any traffic control measures after such precautions have been carried out by the Contract Administrator.

Basis of Payment

Payment for this Item shall be pro-rated over the length of the construction period proportionate to the value of work completed relative to the total estimated value of the Contract.

3. SCHEDULE B: SITE WORKS

Item B1: Remove and Cap Existing Watermain

The Contractor shall perform works in a manner to minimize disturbance to residents, occupants, pedestrian and vehicular traffic and public and private property. The Contractor shall ensure the watermain has been isolated before removal. Isolation of watermain must be coordinated with the Engineer and Town of Shelburne. All materials to be removed from site and disposed of. The Town of Shelburne has the first right of refusal for all material removed. Watermain is to be capped at both ends of the section indicated on the Contract Drawings. The granular material from the road base it to be relocated, spread, and compacted at the future parking lot area. The watermain trench is to be filled and graded according to the grading plan.

Basis of Payment

Refer to Schedule of Unit Prices for basis of payment. The Contractor shall include in the price bid for this Item all labour, equipment and materials required to remove the watermain, cap the existing watermain, and match the grading plan indicated in the Contract Drawings. The Contractor shall include costs associated with hauling in the bid price.

Item B2 a), b), & c): Water Service Work

The Contractor shall remove the existing curbstops, risers, service lines, and posts indicated on the Contract Drawings. The Contractor shall shut off the main stop at the watermain at each location. The Contractor shall backfill and compact each location to match the existing profile. This includes all material, labour, and equipment to remove the indicated water services.

For the proposed water bottle refill station, the Contractor shall locate the indicated existing curbstop/water service and relocate the service to supply water to the refill station. The Contractor shall ensure the service line is sized correctly for the refill station.

The Contractor shall supply, install, and commission the water bottle refill station on top of the concrete path. Water bottle refill station to be *Willoughby Stainless Fountains CWBF-1-RPB Series Outdoor Bottle Filler*.

Model CWBF-1-RPB outdoor bottle filler shall be a single level, vandal resistant, drinking fountain with 316 stainless steel body, complete with a shutoff valve, 4 bolt hole mounting kit. Filler spout shall be activated by a recessed mounted solid stainless steel pushbutton assembly which controls a lead-free, self-closing valve. Pushbutton operation shall require less than 5 lbs. of force. Model CWBF-1-RPB bottle filler shall be lead-free and in compliance with ANSI/NSF 61, Section 9 requirements. Colour shall be blue.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B3 a) & b): Removal of Existing Gravel Road
(Material to be relocated to future parking lot location on-site)

The Contractor shall remove and relocate the granular material from the indicated roads within the site to the proposed parking lot location. The material from the indicated roads must be acceptable for reuse, as deemed by the Engineer. The parking lot location shall be stripped of topsoil before material is relocated. The relocated material shall be spread and compacted within the proposed parking lot location.

Removal of existing roads include the full “Middle Road”, 66% of the “Bottom Road”, the laneway beside the Concession Building, and the laneway beside the existing dumping station.

All roadways are to be reinstated with material to match the proposed grade of the site.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B4: Grouting of Existing 100 mm dia. PVC Sewage Dumping Opening in Manhole

The Contractor shall grout the existing 100 mm dia. PVC sewage dumping opening at the manhole indicated in the Contract Drawings. The entire opening must be grouted from top to bottom, ensuring grout does not spill into the manhole.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B5 a), b) & c): Supply, Place and Compact Granular B (300 mm depth), Granular A (150 mm depth), and Hot Mix Asphalt HL3 (75 mm depth) for Main Walking Path

The Contractor shall strip topsoil and excavate existing mater down to the subgrade profile, around the main walking path. The Contractor shall supply, place, and compact Granular B (300 mm depth), Granular A (150 mm depth), and Hot Mix Asphalt HL3 (75 mm depth) for the main walking path.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B6 a), b) & c): Provisional: Supply, Place and Compact Granular B (300 mm depth), Granular A (150 mm depth), and Hot Mix Asphalt HL3 (75 mm depth) for Parking Lot at Existing Building

The Contractor shall supply, place, and compact Granular B (300 mm depth), Granular A (150 mm depth), and Hot Mix Asphalt HL3 (75 mm depth) for the concession building parking lot. Scratch surface before work to determine existing subbase. Engineer to inspect existing conditions to determine if suitable for reuse.

Basis of Payment

The Contractor shall note this Item is included *provisionally* and shall be completed on an as-approved basis. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B7 a) & b): Cut/Fill and Grading to Construct Swale and Match Site Grading Plan

The Contractor shall cut/fill and grade the site to match the site grading plan on the contract drawings. Cut material must be suitable for reuse. The Contractor is responsible for minimizing disturbance to areas outside of the immediate construction zone to avoid additional restoration. Provide test results proving material is suitable for any fill brought to site. Swale must be graded to allow water to flow downstream and prevent any pooling water.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B8 a) & b): Supply and Place Culverts in Swale

The Contractor shall supply and place three (3) 400 mm dia., 9 m long CSP culverts under the swale crossings. The Contractor shall complete the swale defining work before the culvert installation. The culverts shall be placed to allow water to flow downstream and prevent any pooling water.

The Contractor shall supply and install rip-rap with Terrafix 270 geofabric underlay around the culvert ends at the swale crossing. Rip-rap sizing shall be between 150-250 mm diameter.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B9 a) & b): Supply and Installation of Rigid Box Insulation

The Contractor shall install rigid box insulation where the swale intersects with the watermain as shown on the Contract Drawings. Insulation shall be installed 150 mm from the obvert of the watermain, spanning the bottom of the swale. Insulation shall be installed under the proposed concrete walkway section in front of the pavilion (30.69m x 3.5m). Adjacent insulation sheets shall be secured together with tape. The insulation shall be 0.6m x 2.4m x 50mm thick rigid sheets with a minimum R-Value of 10.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B10 a) – d): Playground Area Civil Work (393 sq.m)

The Contractor shall supply, place, and compact 19mm clear stone (200 mm depth) and granular A (150 mm depth) at the playground location indicated on the Contract Drawings. The Contractor shall supply and install a 150 mm perforated drainage pipe around the perimeter of the playground, connected to the proposed dry well. All drainage pipe shall be 150 mm dia. "Big O" perforated pipe wrapped with a geofabric sleeve and surrounded by 19mm clear stone. The dry well shall be a Flo-Well or approved equivalent and installed as per the detail on Drawing C5.1. The dry well shall have a drainage tile outlet flowing into the proposed swale.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B11 a) – f): Asphalt Court Construction (395 sq.m)

The Contractor shall supply, place, and compact 19mm clear stone (200 mm depth), granular A (150 mm depth), and HL3 hot mix asphalt (75 mm depth) at the court location indicated on the Contract Drawings. The Contractor shall supply and install a 150 mm perforated drainage pipe around the perimeter of the court, with an outlet flowing into the proposed swale. The drainage pipe shall be wrapped with a geofabric sleeve and surrounded by 19mm clear stone.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B12: 150 mm dia. Drainage Tile around Tiered Seating Area Draining to Swale

The Contractor shall supply and install a 150 mm perforated drainage pipe under the tiered seating with an outlet flowing into the proposed swale. The drainage pipe shall be wrapped with a geofabric sleeve and surrounded by 19mm clear stone.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B13: Supply and Installation of Metal Soffit Ceiling within Pavilion

Reference Sections:

- Section 09915 – Painting & Finishing
- Section 07411 – Prefinished Metal

The Contractor shall supply and install a prefinished perforated metal, 24 ga., V-rib soffit panel ceiling at the pavilion. Ceiling to be vented aluminum 4-panel soffit. The colour shall be white.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B14 a), b) & c): Pavilion Column Modifications

Reference Sections:

- Section 09915 – Painting & Finishing

The Contractor shall supply and install two (2) column concrete footings and reinforcement as per the Contract Drawings. The Contractor shall supply and install two (2) HSS columns (HSS 127mm X 127mm x 7.9mm W/ 3/4" THK X 254mm X 254mm Base Plate & Four (4) 5/8" DIA. HILTI HAS-V-36 Adhesive Anchor Bolts). The Contractor shall supply and install one (1) Steel Beam (W690X140 + Two (2) sill plates on top with two (2) 1/2"Bolts at 610mm). Beams and columns must be primed and painted black as per Section 09915 – Painting & Finishing.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

Item B15 a), b) & c): Construct Asphalt Laneway at Pavilion (405 sq.m)

The Contractor shall strip topsoil and excavate existing mater down to the subgrade profile, at the proposed location. The Contractor shall supply, place, and compact Granular B (300 mm depth), Granular A (150 mm depth), and Hot Mix Asphalt HL3 (75 mm depth) for the laneway.

Basis of Payment

See the Schedule of Unit Prices for the basis of payment for this Item. All material, labour, and equipment to perform this work shall be included in the unit price.

4. SCHEDULE E: Contingencies

The Contractor shall note that Section 8.02 of the OPSS MUNI 100 General Conditions of Contract shall apply to all extra work performed in this Contract. All bidders are to include in their total bid, the unit price and Contract total amount shown in the Schedule of Unit Prices page for Contingencies.

Contractors are advised that payment will be made from the Contingency Funds and only for extra work that is authorized by the Engineer prior to starting such work. Field force accounts shall be verified by the Contract Administrator prior to the Contractor submitting invoices for payment. Failure to follow this procedure may result in the rejection of invoices.

Item E1: Supply & Place Additional Material

The Contractor shall place additional material (Granular "A", "B", 19mm dia. clear stone, and Extra Engineered Fill) where required after receiving approval from the Owner and the Engineer.

Basis of Payment

Refer to Schedule of Unit Prices for basis of payment. Work must be approved by the Town and Engineer before proceeding.

Item E2: Rock Excavation and Removal of Boulders over 1.0 Metre in Diameter

a) Boulder Rock (Over 1.0 m Dia.)

All rocks over 1 meter diameter must be left on-site to be measured and confirmed by the Engineer before payment. Rocks are to be transported to the approved location after measurement.

b) Trench Rock

Any trench rock requiring blasting must be approved by the Owner and the Engineer. Quantities must be clearly identified before proceeding. All blasted material to be transported to the approved location.

Basis of Payment

Refer to schedule of unit prices for basis of payment. Work must be approved by the Town and Engineer before proceeding.

Item E3: Supply & Installation of Rip-Rap with Terrafix 270 Geofabric Underlay

The Contractor shall supply and install rip rap with Terrafix 270 geofabric underlay where required after receiving approval from the Owner and the Engineer. Rip-rap to be installed with a 300 mm thick layer of 150-250 mm diameter rip-rap, unless otherwise specified.

Basis of Payment

Refer to schedule of unit prices for basis of payment. Work must be approved by the Town and Engineer before proceeding.

Item E4: Supply & Installation of Rigid Box Insulation

The Contractor shall supply and install rigid box insulation where required after receiving approval from the Owner and the Engineer. The insulation shall be 0.6m x 2.4m x 50mm thick rigid sheets.

Basis of Payment

Refer to Schedule of Unit Prices for basis of payment. Work must be approved by the Town and Engineer before proceeding.

Section E

Specifications

Specifications
Table of Contents

Spec Number	Description	Revision (Addenda No.)
32 13 17	Concrete Finishing	
32 92 20	Seeding	
32 92 23	Sodding	
32 93 10	Trees, Shrubs and Ground Cover Plants	
32 93 40	Planting Maintenance	
05000	**Division 5: Metals**	
05500	Miscellaneous Metals	
07000	**Division 7: Thermal & Moisture Protection**	
07411	Pre-Finished Metal	
07900	Caulking	
09000	**Division 9: Finishes**	
09915	Painting & Finishing	
16000	**Division 16: Electrical**	
16001	Electrical General Specifications	

01000 – Division 1: General Requirements

PART 1 - GENERAL

1.1 The following Specifications apply specifically to the individual items of work listed in Section B: Schedule of Unit Prices, in its Schedules A through E inclusive. The purpose of these Supplemental Specifications is to list out the work which shall be performed, or to infer beyond reasonable doubt, that work which is required under an item in the Form of Tender, for the Contract price.

1.2 The prices bid for all work included in the Form of Tender, unless otherwise directed in the following specifications, shall be compensation in full for the complete supply of all labour and equipment and materials necessary to construct the work as specified in, shown on, or is reasonably inferable from, these Contract Specifications.

1.3 Further to the above, the prices bid shall also include all costs for any dewatering operations necessary to maintain the groundwater level at a point at least 0.5 metres below the excavation bases, thus facilitating proper completion of the work.

1.4 Should access or services be affected by the work, the notification of emergency agencies and/or affected homeowners shall be the responsibility of the Contractor.

1.5 All dust control and clean-up of mud tracking on existing roads shall be deemed to be included in the Total Bid Price.

1.6 The requirements of the Ontario Provincial Standard Specifications (OPSS) will apply unless otherwise noted. OPSS and Contract Specification numbers referred to under the various items are provided for guidance only as other OPSS and Contract Specifications may also apply.

1.7 Payment shall be based upon the lump sum or unit price bid, as listed in the Schedule of Unit Prices, using actual as-constructed quantities as determined by the Engineer. In the event of any conflict between the Schedules of Unit Prices and OPSS, the basis of payment indicated in the schedules shall take precedence (as modified by "pay lines" indicated elsewhere in this document, if applicable).

1.8 The Contractor shall be aware of and conform to the latest Municipal Engineering Standards, specifications and requirements governing construction works.

1.9 Unless otherwise noted, all granular materials shall be compacted to 100 percent SPMDD and all subsoil to 95 percent SPMDD.

END OF SECTION

01007 – General Instructions

PART 1 - GENERAL

1.1 Tender / Contract Format

.1 This is a Unit Price Construction Tender and Contract.

.2 Include the total cost of doing all the work shown on the Contract Drawings and specified herein. The total cost shall include a fully operational system.

.3 Include incidental costs incurred in completing the work in which the incidental cost is related.

1.2 Location of Work

.1 The proposed work included in this Contract is located in the Town of Shelburne.

1.3 Description of the Project

.1 Work to be completed under this Contract covers, but is not limited to, the following:

.1 Remove and Cap Existing Watermain;

.2 Removal and Relocation of Existing Gravel Roads;

.3 Construction of Main Asphalt Walking Trail;

.4 Cut/Fill and Grading to Construct Swale and Match Site Grading Plan

.5 Supply and Place Culverts in Swale

.6 Prepare Subbase for Playground;

.7 Asphalt Court Construction;

.8 Pavilion Upgrades;

.9 Construction of Tiered Seating Area;

.10 Construction of Concrete Walkways;

.11 Construction of Parking Lot;

.12 Tree Planting;

.13 Landscaping, Seed and Sod;

.14 Hydro Pole Relocation and Installation;

.15 Street Light Installation;

.16 Supply and Installation of Conduit and Light Posts around Walking Trail;

.17 Other Electrical Work.

.2 The Contractor shall conduct safety seminars for all employees new to construction site, so that they might be aware of potential hazards of a work site. The seminars are to be in accordance with the requirements of the Construction Safety Association. In addition, the Contractor shall appoint a Safety Officer, and make that person known to all workers.

1.4 Soils Investigation

.1 Soils information is not included in this document.

1.5 Planning Locates

.1 Available planning locate information is not included in this document. The Contractor is responsible for coordinating physical locates prior to initiating any excavation.

1.6 Behaviour

.1 The site of the work is a community public space. The Contractor and their forces shall maintain an appropriate and cooperative manner in the community at all times. The Owner maintains the right to remove any person from the project for inappropriate behaviour or violation of laws.

1.7 Site Security

.1 The Contractor shall be responsible for the provision of project site security throughout the construction period including start-up, commissioning and performance testing of the new upgrades and no less than a time frame as stipulated within Section B, Instructions for Bidders, Working Time Allotment. The Contractor shall be responsible for arranging for security when they are not on site, (i.e., after normal hours, weekends or other times of extended absence for the work site). The cost will be borne by the Contractor.

1.8 Work Hours

.1 The Contractor and their workforce will be permitted to work Monday through Friday. Any work during weekends and holidays to be approved by the Owner and Engineer.

.2 The successful Contractor will present their anticipated work schedule upon award of the Contract.

.3 Minimum Standards

The Contractor shall execute work to meet or exceed the most current version of the following:

.1 Ontario Building Code unless more stringent requirements of National Building Code of Canada apply;

.2 Rules and regulations of authorities having jurisdiction;

.3 Ontario Fire Code unless more stringent requirements of the National Fire Code of Canada apply;

.4 Occupational Health and Safety Act, R.S.O. 1990, Ontario Regulations, 213/91 and 714/94;

.5 Contract documents;

.6 Ontario Plumbing Code;

.7 Ontario Electrical Safety Code;

.8 Relevant Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD).

1.9 Existing Services

.1 Before commencing work, contact local utility companies and municipal representatives to establish location and extent of existing services and notify the Engineer of findings.

.2 Whenever it is necessary to cut, interfere with, or connect to existing services of facility, do so at hours and times recommended by governing authorities and approved by the Engineer. Ensure this work causes minimal disturbance to occupants, pedestrian and vehicular traffic and public and private property.

.3 Utility Supports in accordance with OPSD 1007.01 may need to be implemented to protect existing services.

.4 Submit schedule and obtain approval from the Engineer for each proposed shutdown of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.5 If unknown services are encountered, immediately notify the Engineer and confirm findings in writing and/or on Contract Drawings. Obtain the Engineer's written direction if such services require cutting, capping or relocation to do work.

.6 Should access or services be affected by the work, the notification of emergency agencies and/or affected homeowners shall be the responsibility of the Contractor.

1.10 Storage of Equipment and Materials

.1 The Contractor will provide their own storage facilities to be located near the work site. The location will be ascertained during the pre-Tender site visit.

.2 The Contractor will fence their storage area and provide security if deemed necessary.

.3 The Contractor will note the requirements for temporary facilities specified under the appropriate sections.

1.11 Taxes

.1 Refer to the Instructions for Bidders.

1.12 Fees, Permits and Certificates

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits when requested.

.4 Pay customs bonds as required when transporting through the United States.

1.13 Contract Documents

.1 The Contract Documents consist of:

.1 Addenda, if any

.2 Table of Contents

.3 Instructions for Bidders

.4 Bid Form

.5 Contract Documentation Forms (including Form of Agreement, etc.)

.6 Special Provisions

.7 General Conditions

.8 Standard Specifications

.9 Contract Administration Forms

.10 Contract Drawings

.2 Contract Drawings form part of Contract Documents:

.1 Keep one (1) copy of contract documents and shop drawings on the site.

.2 The Engineer will provide Contractor one (1) set of full-size hardcopy print of Contract Drawings for record purposes.

.3 The Contractor will be provided a digital PDF copy of the Contract Drawings. It will be the Contractor's responsibility to obtain additional hardcopy sets of the drawings as needed.

1.14 As-Built Record Drawing

.1 As work progresses and as required, record significant deviations from the Contract Drawings.

.2 Obtain and record all pipe elevations, pipe and conduit locations.

.3 Assist Engineer in recording of as-built information.

.4 Prior to Substantial Performance, submit one (1) copy of As-Built Drawings to Engineer. Holdback will not be released until drawings are furnished.

.5 Contractor is to be responsible for any extra engineering costs in correcting As-Built Drawings.

1.15 Additional Drawings

.1 Engineer may furnish additional drawings to clarify work.

.2 Such drawings become part of Contract Documents.

1.16 Material and Equipment

.1 Use new products unless otherwise specified.

.2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

1.17 Concealment

.1 Conceal pipes, ducts, conduit and wiring in finished areas unless otherwise specified.

1.18 Cutting and Remedial Work

.1 Coordinate work to keep cutting and remedial work to a minimum.

.2 Execute cutting and remedial work required. Obtain Engineer's approval before cutting, boring or sleeving structural members.

.3 Use specialists in affected material to execute cutting and remedial work.

.4 Match work to adjoining construction and finishes.

.5 Fit components tight to adjoining surfaces.

1.19 Fastenings

.1 Provide fastenings of type, size and spacing required to assure secure anchorage.

.2 Obtain Engineer's approval before using explosive actuated fasteners.

1.20 Inspection and Testing

.1 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Engineer on corrected work.

1.21 Construction Time and Scheduling

.1 On award of contract, submit monthly cash flow projection and bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been approved by the Engineer, take necessary measures to complete work within scheduled time. Do not change schedule without Engineer's approval.

.2 General Contractor shall ensure that all subcontractors and suppliers are notified of construction schedule. General Contractor shall be solely responsible for liquidated damages and associated costs if the construction completion deadline is not met.

.3 In conjunction with and in form acceptable to Engineer, provide within 10 working days after Contract award, schedule showing dates for:

.1 Submission of shop drawings, material tests and samples.

.2 Delivery of equipment and materials.

.3 Commencement and completion of work of each major component of the work.

.4 Final completion date within time period required by Contract Documents.

.4 Interim review of work progress based on schedule submitted will be conducted as decided by Engineer and schedule updated by Contractor in conjunction with and to approval of Engineer.

.5 Engineer will arrange project meetings and assume responsibility for setting meeting times and recording and distributing minutes.

1.22 Energy Conservation

.1 The policy of the Owner is to effectively conserve energy and non-renewable natural resources in the design and construction of public works.

.2 The Contractor is encouraged to employ all reasonable means at their disposal to carry out an effective energy and natural resources conservation program and use energy saving construction techniques throughout the entire construction period.

.3 With due regard for necessary protection of the property, the safety of workers and public, and overriding By-laws and Regulations, Contractor shall conserve energy and non-renewable natural resources, in such ways as:

.1 Switching off unnecessary lighting, particularly during inactive periods.

.2 Utilizing efficient methods, controls, equipment and enclosures to conserve temporary heating.

.3 Any other construction activities which may result in saving of energy and natural resources.

1.23 Setting Out of Work

.1 Engineer will only provide construction control points and benchmarks at the onset of the work.

.2 If the Contractor removes control points, they shall bear the cost of their replacement.

.3 The Contractor is responsible for the layout of all construction works and the minimum degree of layout required is specified below.

.1 Set out works to correct lines, grades and levels.

.2 Establish control lines and levels for construction of work.

.3 Provide a minimum of three (3) consecutive reference points at a distance not exceeding 15 metres for each section of work.

.4 Provide reference points at closer spacing as required or as directed by Engineer.

.5 Control of lines and grades by use of lasers or other methods may be used if approved by Engineer.

.6 Do not lay pipe unless all reference points and levels are in place along section of work under construction.

.4 Payment for setting out of works to be included with the applicable item for which layout is required.

1.24 Supervision

.1 Provide the necessary supervision and qualified tradespeople to ensure the flow of materials and on-site installation compatible with the overall project schedule and progress.

.2 No separate payment will be made under this item, and the Contractor shall include this cost in the cost of the work being supervised.

1.25 Protection of Survey Bars

.1 Protect survey bars from damage or displacement.

.2 Replacement of bars within the area of work is to be included in the cost of the related work.

.3 Replacement of bars damaged or displaced during construction and which fall outside of the area of work is to be at the Contractor's expense. The Owner will pay for survey bars that must be disturbed to complete the proposed works as determined by the Engineer. This determination must be prior to the disturbance.

.4 All survey bars damaged or displaced during construction are to be replaced by a Legal Surveyor prior to completion of the work.

1.26 Payment Items

.1 Payment shall be based upon the lump sum or unit price bid, as listed in the Schedule of Unit Prices, using actual as-constructed quantities as determined by the Engineer. In the event of any conflict between the Schedules of Unit Prices and Specifications, the basis of payment indicated in the schedules shall take precedence (as modified by "pay lines" indicated elsewhere in this document, if applicable).

.2 Provisional and Contingency Items

.1 The Contractor shall note that Provisional and Contingency items shall only become part of the contract when authorized in writing by the Owner and Engineer. The Contractor shall not have any basis if the Provisional and/or Contingency items are not included in whole or in part, in the contract.

1.27 Dust Control & Clean-Up During Construction

.1 All dust control and clean-up of mud tracking on existing roads shall be deemed to be included in the Total Bid Price.

1.28 Equivalent or Approved Equals

.1 Where pursuant to the Specifications, the Contractor is required to supply an article or group of related articles designated by a trade or other name or an "approved equal", the Tender shall be based only upon supplying the article or group of articles so designated, which shall be regarded as the standard of quality required by the Specification. After the acceptance of a Tender, the Contractor may apply to the Engineer to substitute as an approved equal another article or group of related articles designated as aforesaid. The application shall be in writing and shall state the price for the proposed substitute article or group of related articles, the price for the article or group of articles designated as aforesaid and such other information as the Engineer may require.

.2 No ruling on a proposed substitution will be made prior to the acceptance of a Tender. No substitution shall be made without the prior approval of the Engineer. The approval or rejection of a proposed substitution shall be at the discretion of the Engineer and their decision shall be final.

1.29 Contractor's Use of Premises

.1 The Owner has arranged for easements for construction, storage and access as shown on Contract Drawings.

.2 Make arrangements with property owners if additional areas are required. Obtain written agreements and submit copies to Engineer.

.3 Confine operations within easements for construction, storage and access as shown on Contract Drawings.

.4 Install and maintain snow fencing along working and storage areas and access routes.

.5 Do not enter upon or occupy with workers, tools or materials any lands other than public streets, roadways, rights-of-way or easements shown on Contract Drawings except after written consent has been received from property owner.

1.30 Project Coordination

.1 Do not undertake any part of work without permission of Engineer.

.2 Obtain approval in writing from Engineer for all arrangements made with other Contractor(s).

1.31 Public Relations and Notices

.1 Appoint competent representative to receive and deal with any complaints from public in regard to safety, protection of traffic, condition of road surfaces along line of work, or nuisances on account of work. Note: this representative shall work directly with the Engineer and the Municipality.

.2 Inform Engineer, Owner and local police of name, address, email address and telephone number of public relations representatives within two (2) weeks after date of order to commence work.

.3 Deal promptly with all complaints received and carry out remedial actions to prevent further complaints.

.4 Give adequate notice of schedule (timing and location) of movement of materials, construction activities, maintenance and repairs to affected landowners and occupants of properties adjacent to work areas.

.5 Notify Engineer immediately of any complaints of damage to property or personal injury.

.6 Notify Engineer as soon as possible of action taken in respect to any complaints and outcome of such actions.

1.32 Abbreviations

.1 Abbreviations used in this document:

AASHTO	-	American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standard Institute
APWA	-	American Public Works Association
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
AWPA	-	American Wood Preserver's Association
AWWA	-	American Water Works Association
CGSB	-	Canadian General Standards Board
CSA	-	Canadian Standards Association
HEPC	-	Hydro Electric Power Commission
ISC	-	Indigenous Services Canada
MOECC	-	Ontario Ministry of Environment & Climate Change
MTO	-	Ministry of Transportation of Ontario
MNR	-	Ministry of Natural Resources
OPSD	-	Ontario Provincial Standard Drawings
OPSS	-	Ontario Provincial Standard Specifications

1.33 Project Meetings

.1 Attend any and all project meetings scheduled by Engineer.

.2 Engineer will schedule meetings and notice will be given in writing at least two (2) days before date of meeting.

.3 Pre-Construction Meeting:

.1 Location: Site Designated by Engineer.

.2 Attendance:

.1 Owner’s Representative

.2 Contractor's Superintendent

.3 Resident Inspector

.4 Others as appropriate.

.4 Progress Meetings:

.1 Location of meeting: Site Designated by Engineer

.2 Attendance:

.1 Owner’s Representative

.2 Contractor's Superintendent

.3 Resident Inspector

.4 Others as appropriate.

.5 Representatives of the Contractor attending meetings should be thoroughly informed and knowledgeable with respect to proposed topic of discussion and authorized to act and make commitments with respect to matters agreed to at the meetings.

1.34 Quality Control

.1 Adhere to manufacturer's recommendations with respect to handling, preparation, installation, testing, operation or protection of any product or material to be incorporated in work.

.2 Ensure that all materials supplied are compatible with each other unless specific adjacent materials have been specified. Correct any defective work caused by non-compatibility of materials.

.3 Where practical or desirable, tests will be conducted by Engineer on materials and equipment to be incorporated into permanent works before delivery to site.

.4 Submit to the Engineer full information on materials, equipment and related arrangements to be furnished.

.5 Submit information in a form approved by Engineer.

.6 Submit sufficient information to enable Engineer to determine whether proposed materials, equipment and arrangements meet Contract requirements.

1.35 Traffic Control

.1 Adhere to following requirements when roads are to be closed to traffic:

.1 Provide and maintain pedestrian access to all properties.

.2 Provide and maintain emergency access for fire trucks, ambulances and other vehicles for emergency services.

.2 Provide and maintain detours for traffic where required. Mark detours as directed by Police / Fire / Health Departments, Works Department and Engineer.

.3 Supply and place crushed stone on road to maintain traffic as required.

1.36 Project Identification and Signs

.1 Supply and erect signs at locations designated by Engineer.

.2 Fabricate sign boards to dimensions and details specified.

.3 Provide and erect a suitable, portable and stable framework to support each sign.

.4 Remove and dispose of sign boards when directed or on completion of project.

1.37 Maintenance Work

.1 Perform all maintenance work required during progress of work.

.2 Submit to Engineer a letter setting out arrangements made for carrying out warranty work during period of guaranteed maintenance.

.3 Include in letter telephone number, email address and address for receipt of notices relating to matters requiring action by Contractor at job site.

.4 Maintenance During Construction

.1 Keep pavement surfaces adjacent to and within work area clean.

.2 Keep temporary road surfaces over backfilled excavations free from potholes.

.3 Maintain all surfaces in good condition.

.5 Warranty Work During Guarantee Period

.1 Perform all warranty work required upon receipt of verbal or written notice from Engineer.

.2 Repair or make good sinkages and defects on surfaces of backfilled trenches or excavations.

.3 Repair all damages to structures caused by settlement of ground adjacent to or over excavations.

.6 Maintenance by Owner

.1 The Owner will, without giving notice to the Contractor, repair shrinkages or defects which are dangerous in nature and constitute an emergency.

.2 Engineer will notify Contractor of emergency work performed by Owner.

.3 Cost of labour, equipment and material to perform emergency work to be charged to Contractor.

1.38 Remove and Salvage Items

.1 Items designated to be removed and salvaged are to be dismantled by the Contractor and delivered to the Town of Shelburne Public Works.

1.39 Pre-Construction Photo Record

.1 Prior to construction, the Contractor shall take photographs of each of the proposed work areas in order to record the pre-construction site conditions. The Contractor shall neatly compile and label the location of each photograph and submit the photo record to the Engineer in a PDF.

.2 The Contractor shall be responsible to restore all disturbed areas to their pre-construction condition unless otherwise noted.

1.40 Pre-Construction House Assessment

.1 Prior to construction, the Contractor shall identify to the Engineer any dwelling that may be potentially impacted or damaged as a result of construction operations. The Contractor will carry out a pre-construction house assessment of all dwellings. A qualified firm acceptable to the Engineer shall be carry out the inspection with video and

photographs. The inspection firm shall provide two (2) hard copies and one (1) digital copy of their inspection report to the Engineer.

.2 The Report shall contain the findings and recommendations for protecting any vulnerable dwellings. The Contractor is responsible for any impacts to dwellings that result from construction operation.

END OF SECTION

01050 – Mobilization / Demobilization

PART 1 - GENERAL

1.1 This portion outlines the payment for construction mobilization and demobilization.

1.2 The Contractor shall enter a price in the Schedule of Unit Prices to cover the costs of mobilization and demobilization.

1.3 The price entered for this item shall be consistent with the costs involved but shall not, in any event, exceed 10 percent (10%) of the total price.

1.4 If this item's Bid price is in excess of 10 percent (10%) of the total Bid price, the Owner shall, in preparing Contract Documents based upon the Bid, reduce the price for the said item to an amount not exceeding 10 percent (10%) of the total price and shall add the amount of the reduction to the price for another lump sum item so that the total Bid price shall not be affected.

1.5 The lump sum price entered for this item will include the cost of transportation of all personnel, construction equipment, fuel and other items which shall not become part of the permanent works. The transportation costs of materials incorporated into the works is to be included in the unit price proposed for its related item.

1.6 60 percent (60%) of the price for the mobilization and demobilization item shall be considered as relating to mobilization and the balance to demobilization.

1.7 The payment for mobilization shall be included in the first Payment Certificate issued for the Contract subject to the Engineer being satisfied that full mobilization has been carried out. If the Engineer is not satisfied, they shall allow a payment which, in their opinion, reflects the degree of mobilization effected to date.

1.8 The payment for demobilization shall become due following Preliminary~~.~~ Acceptance of the works and subject to the Engineer being satisfied that full demobilization has been carried out. The Engineer may, in their discretion, allow partial payment for demobilization before full demobilization has been affected.

END OF SECTION

01070 - Cash Allowances

PART 1 - GENERAL

1.1 Scope

.1 This section outlines the requirements associated with the items below included as Cash Allowances in the Schedule of Unit Prices:

.1 Hydro One Allowance

.2 Soils, Concrete and Asphalt Testing Allowance

.3 ESA Inspection and Permits Allowance

1.2 Hydro One Allowance

.1 This cash allowance is intended to cover all work required to be done by Hydro One for the connection of primary electric utility services to the site of permanent works to be installed under this Contract. The Contractor shall coordinate the connection of the new hydro service.

.2 An allowance to cover these costs has been predetermined and extended in the Schedule of Unit Prices. Portions of this amount will only be paid to the Contractor when there is evidence that the Contractor has paid Hydro One for the actual work completed by the utility company. The Contractor shall not be eligible for any mark up on any invoiced amounts from the utility company. The Contractor shall issue purchase orders or deposits to the utility concerned as required.

.3 This allowance is not intended to cover any costs associated with the Contractor's responsibility to obtain and pay for hydro inspections for other works included in this project. Also, it is not intended to cover any costs associated with the installation of secondary hydro services from transformers into permanent works installed under this Contract. These costs shall be borne by the Contractor.

1.3 Soils, Concrete and Asphalt Testing Allowance

.1 This cash allowance is intended to cover all soils, concrete and asphalt testing as deemed necessary by the Engineer for this project. The Engineer will coordinate all required testing with the geotechnical consultant.

.2 The geotechnical consultant will invoice the General Contractors, on a monthly basis, for soils, concrete and asphalt testing that has been completed and approved by the Engineer.

.3 Portions of the allowance listed will only be paid to the Contractor when there is evidence that the Contractor has paid the geotechnical consultant. The Contractor shall not be eligible for any markup on any invoiced amounts from the geotechnical consultant.

.4 This section shall be read in conjunction with Section 01410 – Testing Laboratory Services, where compaction and concrete testing results reveal work that is not in accordance with contract requirements. Contractor shall pay for costs associated with additional testing as required by the Engineer to verify acceptability of work.

1.4 ESA Inspection and Permits Allowance

.1 This cash allowance is intended to cover all inspection and permit costs for the electrical work within this project. The Engineer will coordinate all required inspections and permits with the Electrical Safety Authority (ESA).

.2 The ESA will invoice the General Contractor for inspections and permits. Portions of the allowance listed will only be paid to the Contractor when there is evidence that the Contractor has paid the ESA. The Contractor shall not be eligible for any markup on any invoice amounts from the ESA.

.3 Should inspection results indicate deficient work, the Contractor shall pay for costs associated with any additional inspections or permits as required by the Engineer to verify acceptability of subsequently rectified work.

END OF SECTION

01340 – Shop Drawings, Product Data and Samples

PART 1 - GENERAL

1.1 Submit to Engineer, for review, shop drawings, product data and samples specified.

1.2 Until submission is reviewed, work involving relevant product may not proceed.

1.3 The review of the shop drawings by the Engineer is for the sole purpose of ascertaining conformance with the general design concept. The Engineer will not approve the detail design inherent in the shop drawings. The Contractor submitting the shop drawings shall be responsible for the detail design inherent in the shop drawings. The Engineer's review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all sub trades.

1.4 The Engineer **will not** provide digital copies of Contract Drawing files or base plans for shop drawing preparation.

1.5 The Engineer will review the first two (2) shop drawing submissions for each piece of equipment at the Engineer's cost. Any subsequent review required beyond the first two (2) submissions will be assessed against the Contractor and the related amount will be deducted from Payment Certificates.

PART 2 - SHOP DRAWINGS

2.1 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work: showing fabrication, layout, setting or erection details as specified in appropriate sections. Promotional literature and catalogue sheets (except as noted in Item 2.3 below) will not be accepted as shop drawings.

2.2 Identify details by reference to sheet and detail numbers shown on Contract Drawings.

.1 Dimension in metric (SI) units.

.2 Maximum sheet size 860 mm x 1120 mm.

2.3 Product Data

.1 Certain specification sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

.2 Above will only be accepted if they conform to following:

.1 Delete information which is not applicable to project.

.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.

.6 Information is of suitable size to permit photocopy reproduction.

.3 Samples

.1 Submit samples in sizes and quantities specified or as requested.

.4 Coordination of Submissions

.1 Check and certify as correct shop drawings, product data and samples prior to submission.

.2 Verify:

.1 Field measurements.

.2 Field construction criteria.

.3 Catalogue numbers and similar data.

.5 Coordinate each submission with requirements of work and contract documents. Individual shop drawings will not be reviewed until all related drawings are available.

.6 Notify Engineer, in writing at time of submission, of deviations from requirements of contract documents.

.7 After Engineer review, distribute copies.

2.4 Submission Requirements

.1 Issue submissions at least 14 days before dates reviewed submissions will be needed.

.2 Engineer will accept electronic and/or hard copy shop drawings for Engineer's review and approval. Should contractor choose to provide hard copies of shop drawings, provide sufficient copies (e.g.: 4 to 6 sets) for distribution.

.3 Accompany submissions with transmittal letter in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Number of each shop drawing, product data and sample submitted.

.5 Other pertinent data, such as:

.1 Reference drawing number and item tag identifications as per IFC drawings.

.2 Quantity of item being provided.

.3 Model number(s) of item(s) being provided.

.4 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name of:

.1 Contractor.

.2 Subcontractor.

.3 Supplier.

.4 Manufacturer.

.5 Separate detailer when pertinent.

.4 Identification of product or material.

.5 Relation to adjacent structure or materials.

.6 Field dimensions, clearly identified as such.

.7 Specification section number.

.8 Applicable standards, such as CSA or CGSB numbers.

.9 Contractor's stamp, initialed or signed, certifying approval of submission, verification of field measurements and compliance with contract documents.

.10 Obtain and submit a list of manufacturer's recommended spare parts, lubricants and operation and maintenance equipment. List to include entire project with specific information as to manufacturer's suppliers, product names, model number, address and telephone numbers, etc.

2.5 Required Shop Drawings

.1 Shop drawings to be submitted are to include, but not necessarily be limited to the following. Contractor is to notify Engineer of anticipated deviancies from Contract Drawings and Specifications, as additional shop drawings may be requested.

(*) denotes Stamp required by Registered Professional Engineer, registered in the Province of Ontario.

.1 Reinforcing Steel:

- Locations
- Sizes
- Bar List

.2 Concrete:

- Design Mix
- Method of Placement
- Sealants
- Formwork
- Waterstop
- Plasticizer

.3 Asphalt:

- Asphalt Design Mix

.4 Miscellaneous Metals and Structural Steel:

- Metal Soffit / Fascia
- HSS Columns and Anchor Bolts
- Steel Beam, Sill Plates, and Steel Plates Assembly/Weldment
- Culverts

.5 Electrical:

- Conduit Layout Plans
- Light Posts and Luminaires
- Also Refer to Division 16: Electrical; Found on Electrical Drawings

.6 Miscellaneous:

- Drainage Tile
- Drywell with Cleanout Port
- Basketball Goal Post Assembly
- Basketball Court Line Painting
- Benches
- Waste Receptacles
- Picnic Tables
- Bike Racks
- Shade Sail
- Water Refill Station
- Privacy Screen
- Trail Marker
- Trees
- Armour Stone
- Fences/Railings
- Seed and Sod

END OF SECTION

01400 Quality Control & Assurance

PART 1 – GENERAL

1.1 Section Includes:

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

1.2 Related Sections

.1 All Divisions and Sections are related to this Section.

1.3 Inspection

.1 Allow the Engineer access to the Works at all times. If part of Work is in preparation at locations other than the job site, 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 the Engineer instructions.

.3 If the 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 The Engineer may order any part of the Works 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, the Owner will pay the cost of examination and replacement.

1.4 Independent Inspection Agencies

.1 The Owner's Testing Laboratory or an Independent Inspection / Testing Agencies will be engaged by *the Owner* for the purpose of inspecting and/or testing portions of Work. The cost of such services will be borne by the Owner.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relieve the Contractor from responsibility to perform work in accordance with the Contract Documents.

.4 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defects and irregularities as advised by the Engineer at no cost to the Owner. The Contractor is to pay costs for retesting and reinspection.

1.5 Pre-Construction Photographic Survey

.1 Pre-construction photographic survey as described in the Special Provisions shall be undertaken by the Contractor to the satisfaction of the Engineer prior to the commencement of construction.

1.6 Access to Work

.1 Allow inspection/testing agencies access to the Works, off-site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.7 Procedures

.1 Notify appropriate agency and the Engineer 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.

1.8 Rejected Work

.1 Remove defective work, whether a result of poor workmanship, use of defective products or damage and whether incorporated in work or not, which has been rejected by the Engineer 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 the Engineer it is not expedient to correct defective work or work not performed in accordance with the Contract Documents, the 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 the Engineer.

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 shall be appraised by the Engineer and may be authorized as recoverable.

1.10 Mock-ups

.1 Prepare mock-ups for work specifically requested in specifications. Include for work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to the Engineer.

.3 Prepare mock-ups for Engineer's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the Works.

.4 Failure to prepare mock-ups 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.

.5 If requested, the Engineer will assist in preparing a schedule fixing dates for preparation.

.6 Mock-ups may remain as part of the Works.

1.11 Mill Tests

.1 Submit mill test certificates as required of Specifications Sections.

1.12 Minimum Standard

.1 The Specifications and the Contract Drawings define a minimum standard of Workmanship. The Contractor shall include in the Bid, the cost of any additional work or improvements in the quality of the Works that the Contractor considers necessary to unconditionally guarantee the performance of the completed work in conformity with the Contract for the Maintenance Period.

1.13 Workmanship

.1 The quality of the workmanship and materials shall be first class and the Works shall present a neat and attractive appearance when finished.

.2 If ordered by the Engineer, the Contractor shall make enough openings in the Works and/or materials as are necessary to inspect the works.

.3 Should the Engineer find the work and/or materials so opened up to be faulty in any respect, the Contractor shall remove and make good all defective work and/or materials and shall bear the expense of all such opening, inspecting, and making good.

.4 Should the Engineer find the work and/or materials so opened up to be in acceptable condition, the expense of such opening and closing will be borne by the Owner.

END OF SECTION

01410 – Testing Laboratory Services

PART 1 - GENERAL

1.1 Related Requirements Specified Elsewhere

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Engineer are specified under various sections.

.2 Testing of all works as instructed by the Engineer, shall be the responsibility of the General Contractor.

.3 Testing of the works constructed by the sub-contractors shall be the responsibility of the respective sub-contractor.

1.2 Appointment and Payment

.1 Engineer will appoint and the Owner will pay services of testing laboratory except for the following:

.1 Inspecting and testing required by-laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspecting and testing performed exclusively for Contractor's convenience.

.3 Tests specified to be carried out by Contractor under the supervision of the Engineer.

.4 Additional tests specified by the Engineer.

.2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Engineer may be required to verify acceptability of corrected work.

1.3 Contractor's Responsibilities

.1 Furnish labour and facilities to:

.1 Provide access to work to be inspected and tested.

.2 Facilitate inspections and tests.

.3 Make good work disturbed by inspection and test.

.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Engineer sufficiently in advance of operation to allow for assignment of laboratory personnel and scheduling of tests.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to test laboratory.

.4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Engineer.

.5 Coordinate and pay for all costs associated with transporting of test samples to testing laboratory.

END OF SECTION

01500 – Temporary Facilities

PART 1 - GENERAL

1.1 Access

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary road where directed and provide snow removal if required during period of work.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of contract and make good damage resulting from Contractor's use of roads.

1.2 Storage Sheds

.1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.3 Sanitary Facilities

.1 Provide sanitary facilities for work force and Engineer's staff in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.4 Power

.1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

.2 Install temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.

.3 Electrical power and lighting systems installed under this contract may be used for construction requirements without prior approval of Engineer provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of the duration of the contract.

1.5 Water Supply

.1 Supply potable water for work force in accordance with governing regulations and ordinances.

1.6 Site Signs and Notices

.1 Only Project Identification and Consultant / Contractor signboards and notices for safety or instruction are permitted on site.

.2 Format, location and quantity of site signs and notices to be approved by Engineer.

.3 Signs and notices for safety or instruction to be in English language, or commonly understood graphic symbols.

.4 Maintain signboards, signs and notices for duration of project. Remove and dispose of signs off site on completion of project.

1.7 Removal of Temporary Facilities

.1 Remove temporary facilities from site when directed by Engineer.

1.8 Fuel Storage

.1 All fuel storage tanks shall have an earth containment berm built around them and shall be lined with a 60 mm high density polyethylene liner.

.2 Berms shall be designed to hold 150% of the capacity of the tank they are containing.

.3 Storage areas shall not be located within 150 meters of any watercourse.

END OF SECTION

01545 – Safety Measures

PART 1 - GENERAL

1.1 Construction Safety Measures

.1 Observe and enforce construction safety measures required by National Building Code 2015 Part 8, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario, 1980, Chapter 321, Ontario Regulations 213/91 and 714/82. Worker's Compensation Board and Government statutes and authorities.

.2 Contractor to provide a site-specific Health & Safety Plan and company safety policy within five (5) working days after date of Notice to Proceed and prior to mobilization of equipment, materials and manpower to site.

.3 In event of conflict between any provisions of above authorities the most stringent provision governs.

.4 Where applicable, the Contractor shall be designated the "Constructor" as defined by the Ontario Act.

1.2 Fire Safety Requirements

.1 Comply with requirements of standard for Building Construction Operations FCC No. 301-1982, issued by Fire Commissioner for Canada or most current revision.

.2 This standard may be viewed at Regional Engineer's office and copies may be obtained from:

Fire Commissioner for Canada
Sir Charles Tupper Building
Riverside Drive
Ottawa, Canada K1A 0M2

1.3 Overloading

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.4 Falsework

.1 Design and construct falsework in accordance with CSA S269.1-1975 or most current revision.

1.5 Scaffolding

.1 Design and construct scaffolding in accordance with CSA S269.2 - M1980 or most current revision.

1.6 Excavations

.1 The Contractor / sub-contractors shall be responsible for adequate fencing of all respective excavations overnight and on holidays and shall provide adequate lights and barricades as may be required in the opinion of the Engineer.

END OF SECTION

01560 – Environmental Protection

PART 1 - GENERAL

1.1 Fires

.1 Fires and burning of rubbish on site will not be permitted.

1.2 Drainage and Erosion Control

.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.

.4 Prior to commencing topsoil stripping, excavation or site grading operations, erect siltation control fence to prevent disposal run off from carrying suspended materials from disturbed areas of stockpiles leaving the site. Acceptable product Terrafence with prepositional posts or approved equal.

.5 Removal of vegetation from sloped approaches to watercourses to be kept to a minimum. Excavate and stabilize temporary channel beds prior to any diversion of flow. Compact, stabilize and rip-rap banks and riverbeds that have been disturbed or damaged during construction. Provide splash pads where water is discharged into watercourses. Removal of vegetation from slopes to be kept to a minimum.

1.3 Plant Protection

.1 Protect all trees and plants that are designated to remain.

.1 Contractor will pay special attention to maintaining all existing trees and large shrubs within the limits of the construction zone as designated.

.2 Do not stockpile material within drip line.

.3 Do not allow traffic, vehicles or equipment to compact soil within drip line. To accomplish this, erect temporary snow fence around affected areas.

.4 Prune interfering branches to OPSS 503.

.5 Do not cut tree roots. Tunnel under or around roots by hand digging or directional drilling without damaging roots. Treat all damaged roots over 25 mm in diameter immediately with approved tree paint.

.2 Raising Grades

.1 When fill is less than 400 mm deep, place clean washed gravel around tree trunk to a minimum radius of 450 mm and approximately 50 mm above finished grade.

.2 Use gravel graded 25 mm to 50 mm in size.

.3 Place gravel before earth fill.

.4 Do not leave earth fill in contact with trunks.

.5 When fill is more than 400 mm deep, remove and replant tree to match finished grade.

.3 Lowering Grades

.1 Provide broad rounded mounds for trees to be preserved and located above finished grade.

.2 Cut all exposed or broken roots greater than 25 mm diameter cleanly and cover with topsoil.

.4 Damaged Trees

.1 Contractor will be extra precaution in the protection of trees during this project.

.2 Replace all trees that have been damaged beyond saving.

.3 Replace trees with similar size and species or as approved by Engineer.

1.4 Pollution Control

.1 **Refueling Areas** Review in detail proposed route of construction to plan access routes and fueling areas. Establish suitable fueling and maintenance areas and obtain approval from Engineer. Do not refuel or maintain equipment adjacent to or in watercourses. Do not fuel equipment within thirty (30) metres of any watercourse unless non-spill facilities are used.

.2 **Cleaning Equipment** Do not clean equipment in streams or lakes. Clean construction equipment prior to entering roadways. Do not clean equipment in locations where debris can gain access to sewers or watercourses.

.3 **Spills** Submit procedures for interception, rapid clean up and disposal of spillage that may occur, for Engineer's review, prior to commencing work. Be prepared at all times to intercept, clean up and dispose of any spillage that may occur whether on land or water. Keep all materials required for clean-up of spillages readily accessible on site. Report immediately any spills causing damage to environment to Spills Action Centre of Ministry of Environment (Tel: 1-800-268-6060).

.4 **Use of Herbicides and Pesticides** Coordinate use of herbicides and pesticides with land owners and occupants and Regional Pesticides Control Office of Ministry of Environment and Energy.

.5 **Disposal**

.1 Do not empty fuel, lubricants or pesticides into sewers or watercourses.

.2 Dispose of all construction debris in an approved location.

1.5 Noise Control

.1 Establish and maintain site procedures such that noise levels from construction areas are minimized.

.2 Use vehicles and equipment equipped with efficient muffling devices.

.3 Provide and use devices that will minimize noise level in construction area.

1.6 Dust Control

.1 Prevent dust nuisance resulting from construction operations at all locations on site.

.2 Use water or Calcium Chloride to control dust. Minimize use of Calcium Chloride particularly in close proximity to watercourses or agricultural lands. Transport dusty materials in covered haulage vehicles. Public roadways shall be kept clean and free of mud.

.3 Payment for water Calcium Chloride or brine to be included with the applicable item for which dust control is required.

1.7 Environmental Mitigation Measures

.1 The Contractor shall enter a lump sum price in the space provided in the Schedule of Unit Prices, for all labour, materials and equipment as required to mitigate all environmental impacts as listed in the attached document.

END OF SECTION

01593 –Contractor Site Office

PART 1 - GENERAL

1.1 Requirements

.1 The Contractor shall provide for the use of its own workers, a field office in good condition having a minimum area of 15 square metres, a wooden floor, a plan table 1.5 square metres in size, office equipment including desk, two (2) office chairs, two (2) drawing filing cabinet, adequate lighting and separately keyed lock door.

.2 Contractor to provide and pay for (including any required permits and normal monthly fees) internet, hydro or fuel service. Seasonal heating and air conditioning of the office will be at the Contractor's expense. The office shall be erected in a location suitable to the Engineer. On completion of the works, the field office shall be removed from the site by the Contractor and shall remain their property.

END OF SECTION

01600 – Material and Equipment

PART 1 - GENERAL

1.1 Qualifications

.1 The Contractor / sub-contractors shall provide a qualified superintendent for the job who is experienced in this scale of construction. The superintendent must not be changed without notifying the Engineer 48 hours in advance.

1.2 Protection

.1 In the event of damage, each sub-trade will make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner. In particular, each trade shall take the necessary precautions to minimize water penetration during construction.

1.3 Fastenings

.1 Each trade, except where Contract is for supply only, shall be responsible for all fastening required to complete work of that particular trade.

.1 Supply all fastenings, anchors and accessories and adhesives required for fabrication and erection of the work.

.2 Exposed metal fastenings and accessories shall be of same texture, colour and finish as base metal on which they occur.

.3 Metal flashings shall be for the same material as the metal which will not set up an electrolytic action which would cause damage to the fastening or metal component under moist conditions. In general, exterior anchors for windows, roofing sheet metal and anchors occurring on or an in an exterior wall or slab wall be non-corrosive or hot dip galvanized steel.

.4 Anchoring and fastening devices or adhesive shall be of appropriate type and shall be used in sufficient quantity in such a manner as to provide positive permanent anchorage of the unit to be anchored in position. Install anchors at spacing to provide for required load carrying capacity.

.5 Exposed fastenings will not be permitted without approval by the Engineer prior to use.

.6 Supply adequate instructions and templates and, if necessary, supervise installation where fastenings or accessories are required to be built into work of other trades.

.7 Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted.

.8 Do not use power actuated fastening devices which are stressed in withdrawal on any part of this work without written approval from the Engineer. Take particular stringent safety precautions when using powder actuated fastenings. Only low velocity plunger-type devices are permitted.

1.4 Quality

.1 Unless otherwise noted all equipment installed on this project shall be new.

END OF SECTION

01710 – Cleaning

PART 1 - GENERAL

1.1 General

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

.2 Store volatile wastes in covered metal containers and remove from premises daily.

.3 Prevent accumulation of wastes which create hazardous conditions.

.4 Provide adequate ventilation during use of volatile or noxious substances.

1.2 Materials

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

1.3 Cleaning During Construction

.1 Maintain project site free from accumulations of waste materials and rubbish.

.2 Provide on-site containers for collection of waste materials and rubbish.

.3 Remove waste materials and rubbish from site.

.4 Vacuum clean interior building areas when ready to receive finish painting.

.5 Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

1.4 Final Cleaning

.1 In preparation for substantial completion or occupancy, conduct inspection of sight-exposed interior and exterior surfaces.

.2 Remove grease, dust, dirt, stains, fingerprints and other foreign materials from sight-exposed interior and exterior finished surfaces including glass and other polished surfaces.

.3 Broom clean paved surfaces; rake clean other surfaces of grounds.

.4 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.5 Replace heating and ventilation filters if units were operated during construction.

END OF SECTION

01715 – Testing

PART 1 - GENERAL

1.1 Scope

.1 This section outlines the requirements of leakage and pressure testing of chambers, pipes and appurtenances.

1.2 Reference Standards

.1 OPSS

1.3 Water for Testing Purposes

.1 In pipes and liquid retaining structures designed to hold water or sewage, the Contractor may use potable water from the existing system for testing purposes, contingent on approval from the Town of Shelburne.

.2 Water required for initial testing and filling shall be provided by the Owner directly from the Community water supply at no cost to the Contractor. The time and rate of supply shall be convenient to the Owner.

.3 Water necessary for subsequent fillings required as the result of unsuccessful tests shall be charged to the Contractor at the normal Municipality rate.

.4 The Contractor shall supply all necessary labour, pumps, gauges, caps, flanges, pipework and other apparatus necessary to complete the test.

.5 The Contractor shall be responsible for disposing of test water as detailed elsewhere in these specifications.

1.4 Inspection

.1 All tests shall be carried out in the presence of the Engineer.

PART 2 - PRODUCTS

2.1 Liquid Retaining Structures

.1 Liquid retaining structures shall be tested for water tightness after the application of interior waterproofing materials (if applicable) and upon construction completion of the entire structure being tested. Structures cannot be tested until all concrete has cured

sufficiently and all structural related components (roof assemblies, supports, grout, tie rods, anchoring systems, etc.) are installed to the satisfaction of the Engineer.

.2 Where liquid retaining structures are divided into compartments, each compartment shall be tested individually.

.3 Tanks may be backfilled, but this shall not relieve the Contractor of the cost of re-excavation for necessary repairs.

.4 Liquid retaining structures shall be filled to their maximum level over a 24-hour period. The tank shall then be topped up and checked over the next 24 hours for water tightness. Permissible leakage over this 24-hour period shall be 10 mm. Any leakage in excess of this quantity or any leak which is visible shall be repaired at the Contractor's expenses until the test is satisfactory.

.5 Any visible leaks shall be repaired at the Contractor's expense using methods / materials approved by the Engineer.

2.2 Precast Concrete Structures

.1 All precast concrete structures shall be watertight. No visible leakage into or out of the structure will be permitted.

2.3 Air Piping

.1 Both interior and exterior air piping shall be subject to a compressed air test of 345 kPa for a period of 2 hours. During this period all valves shall be operated, and a soap solution applied to all visible joints.

2.4 PVC, Ductile Iron, Galvanized Steel, Stainless Steel, Copper (Pressure Pipe)

.1 These pressurized pipe materials shall be tested in accordance with OPSS 412 and the specified test pressure shall be 1035 kPa or maximum pipe rated working pressure – whichever is less.

2.5 Concrete Pressure Pipe

.1 This pressurized pipe material shall be tested in accordance with OPSS 412, however, the specified test pressure shall be 600 kPa or maximum pipe rated working pressure – whichever is less.

2.6 Polyethylene Pipe (Pressure Pipe)

.1 This pressurized piping material shall be tested in accordance with OPSS 412 with the exceptions listed below.

.2 The test pressure shall not exceed:

DR Rating	**Test Pressure (kPa)**
32.5	517
26	662
21	827
17	1034
15.5	1034
13.5	1034
11	1034
9	1034

.3 After initial filling, the P.E. pipe shall be pressurized to the test pressure specified above for a period of 3 hours. This is to compensate for initial stretch.

.4 The leakage shall be measured over the next 1-hour period.

2.7 Ribbed PVC (Permaloc), Reinforced Concrete, PVC (Non-pressure)

.1 These pipe materials shall be tested in accordance with OPSS 410 and shall be subject to deflection and leakage testing.

END OF SECTION

01720 – Project Record Documents

PART 1 - GENERAL

1.1 Record Drawings

.1 As work progresses, neatly record significant deviations from the Contract Drawings using fine, red marker on full-size (2x3') white prints.

.2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each drawing title block note: "AS BUILT RECORD". Also circle on List of Drawings each title and number of drawings marked with "as-built" records.

.3 Record following significant deviations:

.1 Depths of various elements of foundation.

.2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement and geodetic elevation.

.3 Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

.4 Field changes of dimensions.

.5 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.

.4 Turn one (1) set of As-built Record Drawings over to Engineer prior to Substantial Completion.

.5 If project is completed without significant deviations from Contract Drawings, declare this in writing and submit to Engineer in lieu of As-Built Record Drawings.

END OF SECTION

02060 - Demolition

PART 1 - GENERAL

1.1 General

.1 The General Conditions of the Contract, the Supplemental General Conditions and Special Provision 1 – General Information, shall be deemed to apply and be a part of this Section of the Specifications.

1.2 Definitions

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

.2 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related required submittal and reporting requirements.

.3 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume / weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.4 Waste Reduction Work plan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.5 Hand Demolition: Systematic demolition of structures by work using hand-held tools.

.6 Mechanical Demolition: Systematic demolition of structures using powered equipment.

.7 Systematic Demolition: Methodical dismantling of structures piece by piece, usually carried out in reverse order of construction.

.8 Rapid Progressive Failure: Method of demolition where key elements of structure are removed causing a rapid and complete collapse of whole or part of the structure.

1.3 Description

.1 The extent of work to be demolished includes watermain, curbstops, risers, service lines and posts, road, pavilion posts and footings, and electrical equipmentthat are to be removed. Quantities, dimensions will have to be ascertained by the Contractor.

1.4 Related Work

.1 Disconnection and removal of electrical cable and other appurtenances.

1.5 Regulatory Requirements

.1 Comply with applicable requirements of the following:

.1 CSA S350 – M1980 (R2003) "Code of Practice for Safety in Demolition of Structures"

.2 Canadian Environmental Protection Act (CEPA), 2012

.3 Canadian Environmental Assessment Act (CEAA), 2012

.4 Transportation of Dangerous Goods Act (TDGA), 1992

.5 Motor Vehicle Safety Act (MVSA), 1995

.6 Waste Audits and Waste Reduction Work Plans, O. Reg 102/94

.7 General – Waste Management, R.R.O 1990, Reg 347

.8 Conform to the Occupational Health and Safety Act Ontario Regulation213/91, Amended to O.Reg.628/05; Construction Projects.

.9 Occupational Health and Safety Act Revised Regulation of Ontario, Regulation 838, Amended to O.Reg.-104/04 Designated Substance-Asbestos on Construction Projects and in Building and Repairs Operations.

.10 Conform to the OBC, especially Division C, Part 1.2.2.3. (Demolition Permit)

.11 Conform to Fire Code, Regulation, under the Fire Protection and Prevention Act, especially Part 8.

1.6 Submittals

.1 The Contractor, and a Professional Engineer retained by them, is responsible for the preparation of a demolition plan and sequencing of the removals for the Pavilion structural upgrades. The demolition plan shall be developed to ensure that no unexpected or progressive collapse of the structure occurs. Additionally, the methodologies put forth in the demolition plan shall minimize the potential for damage to adjacent properties, and annoyance to the occupants of the adjacent properties, as a result of ground vibration or noise or airborne pollution and dust. Where required by authorities having jurisdiction, submit drawings, diagrams or details showing sequence of dismantling work and shoring of structures during demolition.

.2 Drawings for temporary works or shoring of structural elements shall be signed and sealed by a Professional Structural Engineer licensed in the Province of Ontario.

.3 The WMC is responsible for ensuring all reporting requirements are fulfilled to the satisfaction of Owner.

.4 Prior to commencement of work on site, submit detailed waste removal work plan indicating anticipated percentages of reuse (if any), recycling (if any) and landfill, schedule of selective demolition (if any), material description and quantities of materials to be salvaged (if any), number and location of dumpsters, anticipated frequency of tippage, and name and address of all haulers, waste facilities and waste receiving organizations.

.5 Submit copies of certified weigh bills, bills of lading and receipts from authorized disposal sites and reuse and recycling facilities for all material removed from site on a weekly basis or upon request of the Owner's Representative. Written authorization from the Contractor's Engineer is required to deviate from the waste removal work plan.

.6 The Contractor shall submit, in order to substantiate project performance and payment certification, official documentation verifying the acceptance of all designated substances and goods into and by a certified waste management site.

1.7 Qualifications

.1 Use skilled personnel having substantial experience in careful removal of materials, items and equipment.

1.8 Protection

.1 Support affected structures and, if safety of adjacent structures or services appears to be endangered, take preventative measures and then cease operations and notify the Consultant.

.2 Provide, erect and maintain required hoarding, sidewalk sheds, catch platforms, lights and other protection around the site before commencing work. Maintain such areas free of snow, ice, mud, water and debris. Lighting levels shall be equal to that prior to erection.

.3 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.

.4 If the Consultant considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon the Consultant's orders. Should Contractor fail to comply promptly with such request, such bracing and shoring may be placed by the Consultant at Contractor's Expense.

.5 Take precautions to guard against movement, settlement or collapse or adjacent services, sidewalks, driveways, or trees or other landscaping except where items are designated for removal. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repairs promptly such damage when ordered.

.6 Maintain fire exits from site.

.7 Where applicable, remove or neutralize hazardous or toxic materials identified during survey before demolition begins.

.8 Prevent debris from blocking surface drainage system and any other systems which must remain in operation.

.9 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.10 Fires and burning of waste or materials is not permitted on site.

.11 Do not bury waste or materials on site.

.12 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.13 Control disposal or runoff or water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.14 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.15 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads and site access points.

PART 2 - PRODUCTS

2.1 Materials

.1 Gravel fill in accordance with OPSS 1010, 19mm Crusher-Run Limestone.

.2 Provide materials necessary for temporary shoring. On completion, remove temporary materials from site.

.3 Except as indicated on Drawings, materials forming permanent part of structure being demolished shall become property of this Section. Remove from Site.

.4 Remove contaminated and dangerous material from Site and dispose of in safe manner to minimize danger involved at Site or at any time during disposal.

2.2 Equipment

.1 Equipment and heavy machinery to meet or exceed all applicable emission requirements and be operated in compliance with EPA CFR 86.098-10 and EPA CFR 86.098-11 standards.

.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3 - EXECUTION

3.1 Execution

.1 Ensure that areas where equipment and materials are to be removed are unoccupied, and that all Designated Substances have been removed from the site in accordance with environmental reports specific to this project site prior to commencement of demolition work.

.2 Disconnect and cap obsolete mechanical and electrical services. Verify with Owner that the services have been turned off. Identify and protect any active services passing through to adjoining floors or areas.

.3 Before commencing demolition operations, examine Site to determine type of construction, condition of structure and Site conditions. Assess strength and stability of damaged or deteriorated structures.

.4 Before demolishing structural elements which may be suitable for re-use, (steel beams, columns, prefabricated assemblies, etc.) determine if elements are to be disassembled, labelled and otherwise coordinated with a set of existing plans or a site survey, to permit re-assembly at a future location. Torching or distorting elements may prohibit future re-use other than for sale as scrap materials.

.5 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.

.6 The lateral stability of the concrete and brick walls should be verified and braced as required, depending on the sequencing of the structural removals. Block walls may also provide lateral stability to the building frame; thus, additional temporary bracing may be required.

.7 Assess effects of demolition on adjacent properties, and consider need for underpinning, shoring and/or bracing.

.8 Investigate the following conditions:

.1 Load-bearing walls and floors.

.2 Structure suspended from another.

.3 Cantilevered construction.

.4 Presence of pre-stressed or post-tensioned elements.

.5 Effects of soils, water, lateral pressures on retaining or foundation walls.

.6 Basements, tunnels, vaults or similar underground, construction extending beyond perimeter of structure to be demolished.

.7 Presence of tanks, wells, other piping systems.

.8 Presence of hazardous materials.

.9 Contact designated authorities or utility companies for assistance in locating and making service passing under, through, overhead or adjacent to structure to be demolished. Such services include but may not be limited to:

.1 Electrical power lines.

.2 Gas mains.

.3 Oil pipelines.

.4 Communication cables.

.5 Watermains.

.6 Drainage piping (storm and sanitary).

.10 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential drainage areas and photograph each for record purposes before starting work. Record termination points referencing property lines or other permanent features of all utilities on a set of site plan prints and provide a copy to the consultant.

.11 Obtain permission from adjacent property regarding use outriggers, swinging cranes and similar equipment.

3.2 Demolition

.1 All demolition work to be coordinated by General Contractor.

.2 Report any unforeseen conditions of demolition.

.3 Demolish structure and foundations and remove materials from site. Crush all concrete generated due to the demolition of structures to a size suitable for recycling. Where possible identify markets which will accept crushed material as aggregate. For further information regarding acceptable uses, contact provincial aggregate producer's associations.

.4 Demolish and remove interior partitions, walls, ceilings, flooring down to concrete substrate.

.5 Separate attached structures by hand demolition prior to general demolition. Separation may be carried out in advance of demolition at each level.

.6 Remove all mechanical and electrical items.

.7 Clear floor crawl spaces of plumbing and heating apparatus, piping, fixtures and fitting, electrical equipment and wiring and wood work.

.8 Fill all open space more than 450 mm (18”) below finished grade with rocks, bricks, broken concrete, or other approved material. For final 450 mm (18”) of fill, place gravel or approved earth and topsoil.

.9 Fill materials and areas to be filled shall be free of standing water, frost, frozen materials, trash and debris.

3.3 Disposal and Clean-up

.1 At the end of each workday leave Place of Work in broom-clean condition.

.2 All demolished materials, unless identified to be relocated or stored, shall become the Contractor’s property and shall be removed from site and legally disposed.

.3 Conform to requirements of local Municpal and Federal guidelines.

.4 Materials prohibited from Government waste management facilities shall be removed from Site and disposed of at recycling companies specializing in recycled materials.

.5 Conform to requirements of the Ministry of the Environment, Conservation and Parks for disposal of wastes.

3.4 Existing Services

.1 Provide and maintain temporary services required during demolition to the satisfaction of authorities having jurisdiction, fire departments and utility companies.

.2 Before commencing demolition, contact Electrical Department of local authorities and tour Site with them. Disconnect and seal electrical power lines and communications cables entering buildings to be demolished. Post warning signs on electrical lines and equipment, which must remain energized to serve other properties during the period of demolition.

.3 Disconnect and cap mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by Gas Company or by qualified tradesman in accordance with Gas Company instructions. Remove and dispose of other existing underground services and mechanical equipment.

.4 In event of unexpected discovery of buried fuel or other tanks do no further work and immediately report discovery, orally and in writing to the Consultant. The Consultant

will authorize remedial work if any, in writing, do such remedial work as additional to Contract.

.5 Remove electrical equipment scheduled for removal on Drawings and as required by the Work.

.6 Remove sewer and water lines indicated on Drawings and cap to prevent leakage.

.7 Record termination points referencing property lines or other permanent features of all utilities on a set of site plan prints and provide a copy to the Consultant.

3.5 Performance

.1 Ensure a competent foreman supervises demolition work at all times.

.2 Demolition shall proceed safely in systematic manner from roof to grade, as specified herein as a guide but as directed by the Contractor's Engineer, and as necessary to accommodate remedial work indicated. Work on each floor level shall be complete before commencing work on supporting structure. Ensure the safety of the supports is not impaired by demolition of other parts of the building, which would otherwise cause premature collapse. Walls and piers shall not be undermined.

.3 Materials and other debris shall not be stacked in building to extend that overloading of any part of structure will occur.

.4 At end of each day's work, leave work in safe condition ensuring that no parts of structures are in danger of collapsing.

.5 Until acceptance, maintain and preserve active utilities traversing premises.

.6 Keep work wetted down to minimize dust.

.7 Minimize noise. Avoid use of noisy machinery outside working hours.

.8 Provide enclosed chutes for disposal of debris from heights more than 1-storey in accordance with CSA S350-M.

.9 Provide protection around floor and/or roof openings.

.10 Upon completion of demolition work, level and clear Site or prevent access to excavations by means of fences or hoarding.

.11 Maintain safety of Site by shoring against collapsed below grade-structures and excavations resulting from demolition.

3.6 Methods

.1 Hand and mechanical demolition shall be acceptable for work of this section. Verify with the Consultant whether proposed methods of demolition are acceptable.

.2 Following methods of demolition will not be permitted in work of this Contract:

.1 Use of rapid progress failure methods (explosive).

.2 Mechanical method of demolition whereby wrecking is accomplished by smashing walls and floors with heavy weight suspended by cable from boom hoist (balling).

3.7 Measurement and Payment

.1 Measurement and payment for work of this Section shall be in accordance with the items in the Schedule of Unit Prices.

END OF SECTION

02151 – Shoring and Bracing

PART 1 - GENERAL

1.1 Scope

.1 Designing, supplying, placing, bracing and removing any temporary shoring of the sides of excavations. Also covers excavations shoring to be left in place and underpinning and/or temporary supports for existing utilities which may be necessary in order to execute construction of works.

.1 Protection of adjacent structures, utilities, pipelines, or other foundations on grade from damage and/or displacement.

.2 It will be the Contractor's decision whether to carry out general excavation in open cut or to use shoring system to conserve space and/or control groundwater infiltration.

.3 Shoring is mandatory where indicated and in all areas where excavation will potentially undermine existing structures, pipes, conduits, utilities or road.

1.2 Related Work

.1 Applicable sections of Division 1.

.2 Applicable sections of Division 2.

1.3 Geotechnical Report

.1 A Geotechnical (Soils) Report is not included in this document.

.2 Contractor to take full responsibility for obtaining necessary geotechnical information prior to planning and execution of shoring work.

1.4 Responsibility for Shoring System

.1 Engage a professional engineer, registered in the Province of Ontario, who has a minimum of five (5) years' experience in shoring and underpinning work, to design and supervise construction of temporary structures which are required in order to execute construction of permanent works.

.2 Take full responsibility for design, supplying, placing, installation, maintenance and where applicable removal of shoring system.

.3 Comply with all safety requirements of the Occupational Health and Safety Act and Ontario Building Code.

1.5 Design of Shoring System

.1 Design shoring system for all applicable lateral pressures from soil and groundwater, including unsymmetrical surcharge loads from construction operations and frost action on retained soil.

.2 Design excavation shoring and/or underpinning systems based on recognized geotechnical and structural theories and principles and site conditions encountered.

.3 Design underpinning and temporary supports for existing structures and/or utilities to safely resist all loads including loads which may be imposed as a result of construction operations.

.4 Design bracing to be fully effective at all stages of construction. Prestress bracing, if required, to control deflection.

.5 Where shoring system retains materials which provides support for foundations at a higher level, design to limit deflections so that foundation materials are not disturbed or weakened.

.6 For steel sheet piling of type with interlock at neutral axis, base design on complete slip of interlocks.

.7 Coordinate design of shoring system with design of dewatering system to meet performance requirements specified herein.

1.6 Shop Drawing / Submittals

.1 Submit shop drawings of temporary structures including shoring and bracing systems. Shop drawing to bear seal and signature of a Professional Engineer, registered in the Province of Ontario, who has carried out the design and who will provide construction supervision of temporary structures.

.2 Indicate on shop drawings the following:

.1 Dimensions and elevations.

.2 Temporary struts and walers, etc., their relationship to permanent structure and schedule for removal (if applicable).

.3 Relationship to new and existing structures and utilities.

.4 Material designations, grades, sizes, etc.

.3 Take the full responsibility for design, supplying, placing installation and maintenance.

1.7 Shoring Performance Requirements

.1 General Requirements

.1 Construct substantially watertight excavation shoring systems suitable for geotechnical conditions encountered and which will meet all requirements of these performance Specifications. Prevent destabilization of subgrade, damage to any structure and/or works. Prevent disturbance, displacement or damage to sides and bottom of excavation to new and existing structures, pipelines, utilities, roads, embankments, etc., at any stage of construction of works. Prevent destabilization or failure of bottom of excavation from shear, heave, groundwater pressure or any other cause.

.2 Watertightness

.1 Shoring system to be watertight to the extent that any dewatering required inside the excavation shall not lower the water table on exterior side of the shoring system.

.3 Tolerances (if shoring section is to be used as a form for structural concrete)

.1 If to be used as a form of structural concrete, install shoring so that, exclusive of temporary walers or bracings, no part of temporary structure to be left in place above the bottom of the excavation in its deflected position will reduce structural concrete well thicknesses below the dimensions indicated.

.2 If the shoring installation does not satisfy these requirements, alter it, at no extra cost to Owner, until it meets the requirements.

.3 Allow a minimum installation tolerance of 75 mm.

.4 Fill the space between shoring and structural member with concrete.

.4 Monitoring Deflection

.1 Monitor and keep a written record of deflections of the shoring system at all critical locations. The Engineer reserves the right to review and field check the Contractor's records.

PART 2 - PRODUCTS

2.1 Materials

.1 Structural Steel Members

.1 CAN/CSA G40.21M 300W for walers, soldier pile sand bracing.

.2 Steel Sheet Piling

.1 Per CAN/CSA G40.20/21M interlocking type of type to meet design requirements.

.3 Welding

.1 CSA W59.

.4 Steel Liner Plates

.1 Corrugated proprietary steel liner plates with bolted joints and grouting nipples supplied on a sufficient number of plates to provide grouting connections at 3 m maximum around the circumference and every second ring of plates.

.5 Lumber

.1 Graded lumber, sound, straight, free from cracks, shakes, large or loose knots. Use planks for sheeting, tongued and grooved, or grooved and splined as required.

.6 Grout as per Section 03305.

.7 Concrete as per Section 03305.

PART 3 - EXECUTION

3.1 Inspection

.1 Before commencing work, inspect conditions upon which work depends. Inform the Engineer in writing of conditions not identified. Failure to inform the Engineer implies acceptance of existing condition.

3.2 Installation - General

.1 Retain a Professional Engineer responsible for design and supervision of construction of temporary structures to verify that work is carried out in conformance with the design.

.2 Do not place any part of shoring and bracing systems until permission by the Engineer has been given to proceed.

.3 Install shoring so that there is no loose material or voids between shoring and sound undisturbed soil.

.4 Provide and set all excavation, shoring and bracing necessary to prevent cave-in of banks and excavations.

.5 Set all shoring to a true vertical and to dimensions and elevations indicated on shop drawings.

.6 Do not encase any part of temporary structure in the structural concrete of the permanent structure without written permission from the Engineer.

3.3 Steel Sheet Piling

.1 Provide temporary guide frames and bracing to hold sheet piles in proper alignment during setting and driving. Install piling to dimensions and elevations indicated on shop drawings.

.2 Install walers and bracings so not to interfere with reinforcing bars or other parts of permanent structures.

.3 Splices in walers shall develop full strength of member in bending, shear and axial compression.

.4 If bracing members, such as walers, etc., are to be removed during construction, timing and procedure for removal shall not induce stresses in permanent structures or in steel sheet piling or bracing members in excess of those allowed by applicable codes.

.5 Clean inside face of sheeting system of all dirt and loose material to make it suitable for use as outside form for concrete wall if applicable.

.6 Leave sheeting in place unless otherwise specified.

3.4 Soldier Piles and Lagging

.1 Install soldier piles to dimensions and elevations indicated on shop drawings. If soldier piles are installed in pre-drilled holes, fill void around piles with a lean concrete mix before commencing excavation.

.2 Install walers and/or ringwalers, struts and bracing for soldier piles as excavation proceeds and follow behind as closely as possible with lagging installation. Install lagging to bottom of excavation at the end of each day's work.

.3 Wedge lagging tightly against firm soil at all points.

.4 If soil has been loosened, remove it and fill void with drypack concrete rammed tightly between the lagging and firm soil.

.5 Fill all voids between lagging and firm soil with drypack rammed tightly in place.

.6 If bracing members, such as walers, etc., are to be removed during construction, timing and procedure for removal shall not induce stresses in permanent structures or bracing members in excess of those allowed by applicable codes.

3.5 Liner Plates

.1 Excavate to depth of one ring and place liner plates, set first ring true to circle and vertical position.

.2 Excavate for next ring and place liner plates. Do not excavate further ahead of liner in place than the width of one (1) ring.

.3 Grout voids between liner plates and ground, by means of a grout pump. Frequency of grouting to suit conditions but not less frequent than after every second ring has been placed. Do not leave any ring ungrouted overnight.

.4 Do not leave the sides of the excavation exposed below the liner plates at the end of the day's work.

.5 Clean inside face of liner plates of all dirt and loose material to make it suitable for use as outside form for concrete wall.

.6 Provide reinforcing at openings as required by the design.

.7 Clean inside face of sheeting system of all dirt and loose material to make it suitable for use as outside form for concrete wall if applicable.

.8 Leave sheeting in place unless otherwise specified.

3.6 Closed Sheeting for Trenches

.1 Provide and install braced closed sheeting where required for trench construction.

.2 Sheeting system shall be adequate for all loading and pressures and for surcharge effects due to construction equipment and materials in accordance with the provision of the Occupational Health and Safety Act, and the Ontario Building Code.

.3 Where sheeting is to be left in place, the top shall be cut to 1.2 m below grade or as directed by the Engineer.

3.7 Monitoring Deflection

.1 Monitor deflection of shoring systems, on a daily basis, which retains materials that provide support for foundations at higher levels. Verify that their deflections are within specified requirements.

.2 Monitor elevations at each corner and center of existing reservoir daily.

.3 Report to the Engineer immediately if specified settlement limits are exceeded.

.4 Submit written records of settlement and deflection result to the Engineer every week.

END OF SECTION

02210 – Site Grading

PART 1 - GENERAL

1.1 General Requirements

.1 In general site grading including clearing and grubbing and topsoil stripping and stockpiling shall be completed in accordance with OPSS No's 201, 206 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

1.2 Site Conditions

.1 The location of underground utilities as shown on the Contract Drawings is approximate only and the Contractor shall be responsible for obtaining a stakeout of the utility from the company involved.

1.3 Protection

.1 Prevent damage to landscaping, existing pavement, surface or underground utility lines which are to remain. Make good any damage.

.2 The provisions of the Provincial "Guidelines on Erosion and Sediment Control for Urban Construction Sites" shall apply to this Contract. Necessary measures shall include, but not be limited to, the supply and installation of silt fence in disturbed areas made vulnerable to sediment transport.

PART 2 - PRODUCTS

2.1 Materials

.1 Excavated or graded material to be approved before use as fill for grading work. Protect such approved material from contamination.

PART 3 - EXECUTION

3.1 Removal of Topsoil

.1 Strip topsoil when dry enough to prevent contamination of sub grade material. Surplus topsoil is to be disposed of in an onsite location and in a manner acceptable to the Engineer.

.2 Stockpile topsoil on site where directed in a neat and orderly manner acceptable to the Engineer.

3.2 Grading

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

.2 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Moisture content of fill and existing surface to be approximately the same to facilitate bonding.

.3 Compact filled and disturbed areas to Standard Proctor density to ASTM D698-78 as follows:

.1 85 % under landscape areas.

.2 100 % under paved and walk areas.

.4 The Contractor shall be required to trim or build slopes at site boundaries to a grade not steeper than 3H:1V.

3.3 Testing

.1 Inspection and testing of soil compaction will be carried out by designated testing laboratory.

.2 Costs of test will be paid by the Contractor.

3.4 Surplus

.1 Surplus or unsuitable fill is to be disposed of by the Contractor at a location approved of by the Owner.

END OF SECTION

02220 – General Excavation, Dewatering & Backfilling

PART 1 - GENERAL

1.1 General

.1 General excavation, dewatering and backfilling shall be completed in accordance with OPSS No.'s 902, 501, 511, 514, 515, 517, 538, 1004, 1010 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

.3 Trenches and other excavations under this Contract shall conform to the requirements of the Occupational Health and Safety Act and Regulations for Construction Projects, Regulations 213/91 and 714/82 and Revised Statutes of Ontario, 1980 Chapter 321.

1.2 Methods of Excavation

.1 Excavation shall be carried out by methods approved by the Engineer.

1.3 Topsoil

.1 Topsoil shall be stripped from areas where excavation or filling is to be done. Care shall be taken in removing topsoil to avoid mixing it with the underlying clay, gravel, or other material.

.2 Topsoil approved by the Engineer for re-use shall be stockpiled on the site of the work, as directed by the Engineer. Unsuitable surface material or topsoil shall be disposed of as provided herein.

1.4 Slides and Cave-Ins

.1 Slides and cave-ins shall be rectified at the cost of the Contractor. They shall refill all such with suitable materials.

1.5 Surplus Excavation

.1 The Owner has first right of refusal on surplus excavated material, after which it will be the property of the Contractor. The Contractor shall dispose of the material off-site in an area(s) approved by the Owner. The Contractor shall provide a signed Release Form (OPSF 1803) from any private disposal site owner and shall comply with the requirements of OPSS 180. Submit to Engineer Waste Quantity Report Form (OPSF 1805) for all Non-Hazardous Waste.

1.6 Open Excavation Protection

.1 Whenever it is necessary to have excavation left open for any period while the construction crew is not working in the immediate area, or a watchman is not posted, the excavation shall be pumped out immediately after every storm, inspected twice daily for accumulation of water, and adequately barricaded with snow fences or equal, completely around the excavation, equipped with sufficient warning lights, as required by the Engineer. Costs for the above shall be the Contractor's responsibility.

1.7 Excavation Open For A Prolonged Time

.1 If the work is stopped in the whole or any part of an excavation and the same is left open for what is, in the opinion of the Engineer, an unreasonable length of time, because of non-delivery of material, tests or for any other reasons, the Contractor shall, when so directed by the Engineer, refill such excavation or part thereof until he is ready to proceed with construction.

.2 If the Contractor refuses, neglects or fails to completely refill such excavation within 48 hours after the receipt of a notice in writing to do so, the Engineer shall be entitled to refill the excavation and all the cost and expense thereof shall be charged to the Contractor, and the Owner may retain the amount of such cost and expense out of any monies due or to become due the Contractor. Any re-excavation costs made necessary by the above will be borne by the Contractor.

1.8 Tunnelling

.1 Tunnelling not shown on the Drawings will not be allowed without the approval of the Engineer. The method of tunnelling and the location of all shaft, portals, and mechanical plant used in the tunnelling operations shall also be subject to the approval of the Engineer.

1.9 Support of Excavations

.1 Material for sheet piling, sheeting and bracing shall be furnished and driven or set in place by the Contractor where necessary or wherever ordered by the Engineer.

.2 The Contractor shall sheet and brace an excavation in Accordance with the Occupational Health and Safety Act and Regulations for Construction Projects, Regulation 213/91 and 714/82 where necessary in order to prevent injury to workmen, damage to gas pipes, water pipes, sewers, service pipes, or other structures and to prevent movement which could in any way disturb or weaken the supporting material below or beside the works.

1.10 Qualified Personnel

.1 Lumber in foundations and sheeting and shoring on the work shall be driven or placed and moved by personnel especially skilled in such work.

1.11 Shoring Methods

.1 Shoring shall be installed in such a manner as to prevent movement of the soil adjacent to the excavation and adjacent property.

.2 Sheeting, shoring and bracing shall be withdrawn and removed as the excavation is backfilled except where and to such extent as removal will injure or cause settlement of the works and adjacent structures, pavement or property.

.3 Where it may be withdrawn from an excavation, all shoring and sheeting shall be so arranged that it may be withdrawn as the excavation is backfilled, without injury to or settlement of the works and adjacent structures, pavements and property.

.4 Sheeting against which concrete is placed shall not be removed. Such sheeting will not be paid extra. Sheeting may be cut off above concrete.

.5 When sheeting is left in place, all cavities behind such sheeting shall be solidly filled as directed.

1.12 Sheeting

.1 All planks used for sheeting or sheet piling, all timber used for braces, shore and stringers or walings shall be sound, straight and of dimensions satisfactory to the Engineer throughout. Planks shall be tongued and grooved if so required by the Engineer. Where, in the opinion of the Engineer, infiltration into the excavation or other conditions warrant, special sheeting and shoring or steel sheeting and other materials shall be used.

1.13 Foundation Timber

.1 Cedar, Georgia Pine, Hemlock, or other approved timber shall be furnished, and laid in foundations where required; all timber shall be sound, straight, free from cracks or shakes or large or loose knots and squared to the dimensions required throughout its entire length.

.2 When, in the opinion of the Engineer, it is necessary to lay a timber platform for foundations, the planks used shall be of a kind and quality above described and cut and laid in the manner designated. They shall be firmly spiked, nailed or bolted to the sills in the manner and to the extent required by the Engineer.

1.14 Dewatering

.1 The Contractor shall remove such water as may be necessary to properly do the work and shall receive no extra payment for this measure.

.2 The Contractor shall keep any excavation and ground adjacent to excavation, if necessary, free from water during construction progress. They shall build dams and do other work necessary for this purpose and provide and keep in operation necessary pumps of sufficient capacity to keep the bottom of the excavation dry and free from water at all times. They shall provide for the disposal of the water removed from the excavation in such a manner to ensure that it shall not be injurious to health, property, any portion of the work completed or under construction either by him or by any other contractor. Water removed from the excavation shall be discharged to the surface of the streets to ensure that it shall not be a nuisance to the public traversing the street.

.3 There shall be no separate payment made to the Contractor for dewatering. Include the cost associated with dewatering in the item where dewatering may be required.

1.15 Backfilling General

.1 Backfilling comprises providing acceptable excavated materials approved by the Engineer, or fill materials procured from approved sources, transporting them to the required location, placing, spreading, compacting and grading them to the levels and profiles shown on the drawings or designated by the Engineer. The Contractor shall dry out all materials of suitable gradation before backfilling to obtain specified Proctor Density.

1.16 Cut to Fill Balance

.1 The Contractor shall perform their own calculations to determine the cut to fill deficit / excess. If a deficit exists, they shall import suitable backfill material necessary to balance the earthwork. If an excess exists, the surplus material shall be removed from the site to a suitable location approved by the Engineer. The costs of importing / removing material necessary to balance the cut to fill quantity is to be included in the applicable item listed in the Schedule of Unit Prices.

1.17 Fill Materials

.1 Materials shall be free from large or frozen lumps, wood or other extraneous materials.

.2 Selected fill will consist of excavated materials free from stones having a maximum dimension no greater than 150 mm.

.3 Native material will consist of approved suitable excavated materials.

.4 Granular fill will consist of materials conforming to OPSS 1010 for Granular 'A', or for Granular 'B'.

1.18 Rip-Rap

.1 Rip-rap shall be quarried rock of sizes averaging 200 mm with a maximum size of 300 mm and a maximum proportion of 10% by weight smaller stones and spalls less than 150 mm maximum dimension intermixed.

.2 The quality of stone shall be approved by the Engineer. Weathered stone subject to excess deterioration will not be acceptable.

.3 Stones shall be hand placed in such a manner as to minimize the volume of voids and also to present a uniform appearance. To prevent washing of the underlying material. Terrafix 270 R geotextile or approved equal shall be placed between the stone and underlying material.

1.19 Compacting

.1 Backfill shall be compacted to achieve a density of not less than 95% Standard Proctor Density unless otherwise specified or as directed by the Engineer, or as detailed on the Contract Drawings.

.2 Bedding material around the pipe and backfill material immediately over the pipe shall be placed carefully so as not to damage the pipe and shall be compacted using approved mechanical compaction equipment satisfactory for this application.

.3 The following mechanical compaction equipment shall be used with corresponding lifts of backfill. Backhoes, loaders, dozers, etc., shall not be used for compacting.

NORMAL COMPACTED THICKNESS OF LIFTS		
EQUIPMENT TYPE	**COHESIVE SOIL**	**NON-COHESIVE SOIL**
Vibratory Sheepsfoot Packer	300 mm	300 mm
Sheepsfoot Packer	200 mm	--
Pneumatic Roller	200 mm	200 mm
Vibratory Roller (work width less than 760 mm)	150 mm	300 mm
Vibratory Roller (work width greater than 760 mm) Double vibrating drums with transverse 25 mm cleats every 100 mm the circumference of one drum	150 mm	300 mm
Pneumatic Tamper Driven by Compressor	100 mm	100 mm
Mechanical Tamper (diesel or gas) (Jumping Jack)	150 mm	150 mm

1.20 Compaction Tests

.1 The cost of compaction tests will be borne by the Owner, but where re-testing is required due to unsatisfactory results such re-testing shall be paid for by the Contractor.

1.21 Unshrinkable Fill

.1 **Scope:** The work included in this specification is the supply of all material, labour and equipment necessary for the production and placing of a Portland cement stabilized granular backfill known as Unshrinkable Fill in all underground service and utility trenches, and around in-ground structures if applicable.

.2 **Materials:** All materials shall conform to OPSS 1359 providing a maximum 28-day compressive strength of 0.4 MPa:

.3 **Admixtures:** Admixtures shall conform to OPSS 1303. Calcium chloride or pozzolanic mineral admixtures shall not be used. Air entraining admixtures may be added if desired by the Contractor.

.4 **Mix Proportions:** Mix proportions shall be selected in accordance with the latest revision of Section 14 of CSA specification CAN/CSA 3-A23.1-M77 where applicable.

.5 Prior to the production of unshrinkable fill for use, the Contractor shall provide to the Engineer, a certificate from an independent testing company stating that the unshrinkable fill to be supplied conforms with the above requirements.

.6 **Placing:** The unshrinkable fill material shall be placed at a slump between 150 and 200 mm. The material shall flow into the excavation so that it fills the entire space. Care shall be taken to ensure that no air is entrapped beneath horizontal projections or in other locations within the excavation. Where bracing, shoring and/or sheeting is used to support the sides of the excavation or to prevent movements that could damage other services or adjacent pavements, this support system shall be removed as backfilling proceeds.

If the excavation is within the travelled portion of the roadway, it shall be covered for at least 24 hours with steel plate of sufficient strength to support traffic during this period. Where road traffic is not to be accommodated, the backfilled excavation shall be covered with wooden planking or other protection for users of the road allowance until the unshrinkable fill will support the weight of an adult person.

END OF SECTION

02221 – Rock Excavation

PART 1 - GENERAL

1.1 General

.1 The Contractor shall refer to the Geotechnical Information and Contract Drawings to determine the degree of rock excavation that is required. The Contractor shall accept responsibility for the removal of all required rock, regardless of the condition, and prior to bidding is to obtain all supplementary information and specialist assistance necessary to reliably estimate the nature and cost of the work.

.2 The Contractor shall retain the services of a Specialist Blasting Consultant who is a member of the Association of Professional Engineers of Ontario and who has at least five (5) years of experience in the use of explosives and in blasting. Cost of Consultant to be included in Total Bid Price.

.3 Prior to any blasting, a Specialist Survey Consultant shall complete a Pre-Blast Survey of all buildings and structures within 50 metres of the blast site. The Survey shall include the interior and exterior of each building and all accessible surfaces of each structure and shall be documented through digital photos, video or a combination thereof, sufficient to record the location, nature and extent of all pre-blast cracks and other damage. The Engineer is to receive a copy of this Survey prior to the start of blasting operations.

.4 Prior to any hydraulic hammering for rock excavation, a Specialist Survey Consultant shall complete a Pre-Excavation Survey of all buildings and structures within 50 metres of the hammering site. The Survey shall include the interior and exterior of each building and all accessible surfaces of each structure and shall be documented through digital photos, video or a combination thereof, sufficient to record the location, nature and extent of all pre-excavation cracks and other damage. The Engineer is to receive a copy of this Survey prior to the start of hammering excavation operations.

.5 The Specialist Blasting Consultant shall prepare and update a Blast Design giving recommendations on charge patterns and delays suitable for the anticipated conditions. They shall record and monitor a trial initial series of blasts to establish site factors and the maximum allowable charge per delay and shall supply a modified set of blast designs for trench and open excavations taking into account the results of the trials. They are to conduct further trials if rock conditions change substantially and are to modify the Blast Design shall accordingly. Prior to any blasting full information on the current Blast Design along with full records of previous blasting as executed are to be provided to the Engineer, and the Contractor is to follow all recommendations contained in the current Blast Design.

.6 The Specialist Blasting Consultant or their representative shall monitor each blast by recording blast locations, rock characteristics, overbreak, structural damage if any, underbreak, and blast vibration levels at the nearest building or structure within 50 m of the blast site, and ***this data is to be submitted to the Engineer no later than the day following***. Blast monitoring equipment shall be capable of recording longitudinal, transverse and vertical vibration waveforms as well as blast overpressure. Seismographs shall be capable of monitoring up to 200 mm/s peak particle velocity and provide a hard copy of the waveforms on site.

.7 The Contractor shall monitor each hammering location including, rock characteristics, overbreak, structural damage if any, and vibration levels at the nearest building or structure within 50 m of the excavation, and ***this data is to be submitted to the Engineer no later than the day following.*** Monitoring equipment shall be capable of recording longitudinal, transverse and vertical vibration waveforms as well as overpressure. Seismographs shall be capable of monitoring up to 200 mm/s peak particle velocity and provide a hard copy of the waveforms on site.

.8 In the event that complaints are received regarding damage caused by rock excavation, the Specialist Blasting Consultant or Contractor (if blasting is not used) will be required to perform a post-blast or post-excavation survey of the houses / buildings involved.

.9 The supply, hauling, handling and storage of all explosives shall be in accordance with the rules and regulations of the Explosives Division, Department of Mines, Ottawa and the Mining Act and the Transportation of Dangerous Goods Act. Explosives shall be stored in a suitable, locked storage space.

.10 It shall be the responsibility of the Contractor to ensure that blasting and excavation operations are carried out in a safe manner and that all regulations are adhered to. The Contractor shall assume all responsibility for all claims arising from the handling, hauling and storage of explosives, and all effects arising from blasts or other means of rock excavation, including injury, vibration, impact of flying material and movement of ground.

.11 The blast site shall be covered with special blasting mats or other devices to prevent flying rock fragments.

.12 The Contractor shall receive authorization from the Engineer for all rock excavation required under the various items and shall provide adequate time (minimum 48 hours) for the Engineer to verify the initial elevation of rock surface prior to blasting.

Where the trench bottom (subgrade) is in rock a minimum clearance of 150 mm of 19 mm clear stone or A gravel shall be provided below all parts of the pipe and appurtenances.

If 19 mm dia. clear stone or A gravel is not available and the Contractor elects to use sand for bedding, the bedding, pipe and cover material shall be wrapped in filtercloth equivalent to Terrafix 270R.

.13 Payment for rock excavation will only be made when it is necessary to remove by blasting, hoe ram or similar heavy mechanical equipment integral parts of the Precambrian bedrock or boulders or fragments larger than 1.0 cubic metre in volume determined as the multiple of three (3) maximum rectilinear dimensions.

Materials that can be ripped or dug by excavator and also frozen earth, boulders or rock fragments smaller than 1.0 cubic metre shall be classified as General Excavation. Boulders or rock fragments that can be removed by hydraulic excavator shall be paid for at half the unit rate of rock excavation requiring blasting.

.14 Payment limits for trench rock excavation shall be as follows:

.1 Depth shall be the vertical distance from rock surface to 300 mm below the lowest pipe invert.

.2 Width shall be as indicated on the Contract Drawing for the number and diameter of pipes installed. Payment width to be to 300 mm on either side of the outside pipe or pipes.

.3 Length shall be measured horizontally along the centerline of the trench.

.15 Payment limit for surface rock excavation (road construction) shall be to design elevation required for construction of ditching (ditch invert) or placement of road sub-base (final road surface minus 300 mm).

.16 Payment limits for structures (water plant) shall be to 600 mm outside wall of structure, and 300 mm below underside of base slab.

.17 Payment limit for water service shall be based on a 1 m trench width. Payment limit for depth and length shall be as per Item 14.

1.2 Backfilling Rock Excavation

.1 Backfilling for rock excavation may be carried out under the following conditions:

.1 Backfilling with Blasted Rock

.1 Rock no greater than 400 mm diameter in any direction may be placed in the trench for backfill. When rock shatter is used as trench backfill, it shall be combined with suitable approved fill material. In general, after each

1.2 m lift of rock shatter is placed, fill material shall be placed over top of the rock and compacted prior to the next lift of rock shatter being placed.

.2 The Contractor must place 600 mm of compacted granular material over the pipe before backfilling with blasted rock.

.3 No rock blast material of 400 mm diameter or larger shall be placed directly over the buried infrastructure (i.e.: any watermain or sewermain, utility conduit, etc.) within the excavated trench in-order to mitigate any chance of point loading.

.2 Backfilling with Suitable Imported Select Fill

.1 The Contractor shall backfill the complete trench with suitable imported select fill if excavated rock is greater than 400 mm diameter in any direction. Prior to backfilling with suitable select fill, the Contractor must place 300 mm of granular material over the pipe as shown on the Contract drawings.

END OF SECTION

02222 – Excavating and Backfilling Around Structures

PART 1 - GENERAL

1.1 General Requirements

.1 In general, excavating and backfilling around structures shall be completed in accordance with OPSS No.'s 902, 501, 517, 1010 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

1.2 Scope of Work

.1 This section applies to the excavation and backfilling of structures.

1.3 Stockpiling

.1 Material removed from excavations for structures shall be stockpiled as directed by the Engineer.

1.4 Excavation and Backfilling Around Structures

.1 In general, excavation and backfilling around structures shall be completed in accordance with Section 02220: General Excavation, Dewatering and Backfilling with the following exceptions.

.2 If excavation is in rock and the Contractor is required to place and compact structural granular fill from the rock level to the underside of a proposed foundation, filter cloth equivalent to Terrafix 270R shall be placed between the granular and rock interfaces.

.3 Sand shall be used to fill an area within 600 mm in any direction of any structure, including manholes and catch basins, unless shown otherwise on the Drawings. Selected fill shall be used for the remainder of the area to be filled.

.4 The fill adjacent to the structures shall first be placed so that its sides have a natural slope and the sand fill placed over those slopes.

.5 Backfilling around structures shall not commence until all interconnected structural components are completed or until approved by the Engineer.

END OF SECTION

02224 – Excavation and Backfilling In Trench

PART 1 - GENERAL

1.1 Scope of Work

.1 In general, excavation and backfilling in trenches shall be completed in accordance with OPSS No.'s 05, 410, 412, 415, 416, 421, 501, 514, 515, 517, 538, 701 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

.3 This section applies to the excavation and backfilling of excavations for pipes, valves, hydrants and chambers, etc.

1.2 Alignment

.1 Trenches shall be dug to the alignment and depth required and only so far in advance of pipe laying as the Engineer will permit or instruct.

1.3 Stockpiling

.1 Material removed from a trench shall be piled neatly along the side of the trench in a manner which will not interfere with traffic, access to buildings or other premises, and the setting up of sight rails.

1.4 Width of Trenches

.1 The width of the trench shall be sufficient to permit proper laying and jointing of the pipe. Every trench shall have a minimum width 300 mm greater than the external diameter of the pipe barrel.

.2 Where sheeting or shoring is used, the width shall be measured between the interior faces of sheeting as driven or between the walings, if same are below the top of the pipe.

1.5 Preparation of Trench Bottom

.1 The pipe trench shall be shaped to give even bearing for the full length of the pipe. Pipe bedding shall be as shown on the Drawings.

.2 If in the opinion of the Engineer:

.1 The trench bottom (subgrade) is too soft to support the pipe; additional measures may be required, such as sub-excavation and replacement with graded crushed stone.

.2 The trench bottom (subgrade) has excessive boulders or cobbles as to interfere with the proper support of the pipe; the trench bottom shall be excavated an additional 500 mm and shall be backfilled with compacted 19 mm crushed stone.

.3 Where the trench bottom (subgrade) is in rock a minimum clearance of 150 mm of 19 mm clear stone or a gravel shall be provided below all parts of the pipe and appurtenances.

.4 If 19 mm dia. clear stone or granular A material is not available and Contractor elects to use sand for bedding, the bedding, pipe and cover material shall be wrapped in filter cloth equivalent to Terrafix 270R.

1.6 Backfilling In Trench

.1 Backfilling shall commence only after the Engineer has inspected and approved the pipe and bedding. Backfilling to 300 mm above the top of the pipe shall be completed with sand compacted to 100% Standard Proctor Density. Trenches shall be backfilled with granular material and selected fill in accordance with and to the limits as shown on the drawings and then with suitable native material up to the road subgrade compacted to 95% standard Proctor Density. Backfilling is to be completed in lifts from 100 mm to 300 mm as specified under Section 02220: General Excavation, Dewatering & Backfilling.

.2 Backfilling operations in trenches shall proceed immediately after pipe laying and shall also proceed in a manner to allow not more than 30 metres length of open excavation unless permitted or instructed otherwise by the Engineer.

.3 At the end of every day, the Contractor shall ensure that the pipe is blocked with a bulkhead and that backfilling is completed to within 600 mm of the end of the pipe.

.4 Any pipe located beneath a building / structure base slab shall be bedded and backfilled to the underside of the structure with 15 MPa concrete.

END OF SECTION

02225 – Aggregates

PART 1 - GENERAL

1.1 Scope

.1 This section outlines the requirements for aggregates to be used on this project.

1.2 Reference Standards

.1 OPSS No. 1010.

.2 Conform to Sections of Division 1 as applicable.

PART 2 - MATERIALS

2.1 General

.1 To OPSS No. 1010.

PART 3 - EXECUTION

3.1 General

.1 To OPSS No. 1010.

3.2 Measurement for Payment

.1 To be included in applicable work for which aggregates are required.

END OF SECTION

02226 – Restoration

PART 1 - GENERAL

1.1 Scope of Work

.1 In general, restoration shall be completed in accordance with OPSS Nos. 310, 314, 353 507, 570, 571, 572, 540, 541, 552 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

.3 The work under this Section is comprised of the permanent restoration of roadways, shoulders, lanes, footpaths, driveways, ditches, catch basins, and any other areas or existing facilities disturbed or damaged during construction along and in the general vicinity of the works.

.4 Surfaces shall be restored to their original condition using materials of a similar type and quality as, and corresponding to, the original surface but shall meet the minimum requirements defined in subsequent sub-sections of this Specification.

.5 Restoration shall be to neat straight lines.

1.2 Treated Gravel Surfaces

.1 All existing roads within the community that are disturbed by construction activities shall be reinstated as listed herein. The entire width of existing road surface shall be reinstated.

.2 Existing asphalt material removed shall be disposed of at an off-site location or approved by the Town of Shelburne. Include all costs associated with removal and disposal in the total Bid price.

1.3 Granular Base and Sub-base

.1 Unless otherwise shown on the Contract Drawings, minimum restoration of granular base and sub-base shall consist of a 300 mm layer of Granular 'B', followed by a 150 mm layer of Granular 'A' and both compacted to 98% Standard Proctor Density.

1.4 Gravel Shoulders

.1 Unless otherwise shown on the Contract Drawings, minimum restoration of gravel shoulders shall consist of 100 mm of Granular 'A' compacted to 98% Standard Proctor Density.

1.5 Driveways

.1 Unless otherwise shown on the Contract Drawings, minimum restoration of driveways shall consist of 200 mm layer of Granular 'B' sub-base course compacted to 98% Standard Proctor Density followed by 150 mm depth of Granular ‘A” surface course.

1.6 Open Areas

.1 Unless otherwise shown on the Contract Drawings, open areas shall be restored with a 100 mm layer of topsoil, free from weeds, roots, and debris. All open areas shall be seeded conforming to the requirements of Section 02232: Landscaping.

1.7 Payment

.1 Payment for the reinstatement of the existing granular base and sub-base, including gravel shoulders, damaged during construction activities shall be on a linear meter basis of road, reinstated to original or better condition.

.2 There shall be no separate payment for reinstatement of existing driveways inclusive of new driveway CSPs, if necessary.

END OF SECTION

02230 – Roads & Streets

PART 1 - GENERAL

1.1 Scope of Work

.1 This section shall apply to all roads, streets, driveways, laneways and walkways. They shall be completed in accordance with OPSS Nos. 201, 206, 209, 310, 311, 501, 518, 1003, 1010 and as supplemented by this Section.

.2 Conform to Sections of Division 1 as applicable.

.3 The Contractor shall construct the streets, road, driveways, laneways, walkways and ditches to the grade, cross-section and lines as shown on the Contract Drawings unless otherwise directed by the Engineer.

.4 All existing roads, which have been disturbed during construction shall be restored to their original condition by the Contractor to the satisfaction of the Engineer.

1.2 Road Materials

.1 Fill Materials - Fill material shall consist of hard, durable particles of granular aggregates mixed with sand, clay, silt, stone dust and/or other similar cinder material. The material shall be well mixed and graded and in all respects shall meet with the approval of the Engineer.

.2 Sub-Base Course – Sub-base course material shall consist of crushed and screened material conforming to Class “B” of OPSS 1010.

.3 Base Course – Base course material shall consist of crushed and screened material conforming to Class “A” of OPSS 1010 of latest revision.

.4 Approval of Granular Materials – Prior to use, representative samples of all sub-base and base course materials to be supplied by the Contractor, proposed for use under this specification, shall be submitted by the Contractor to a testing laboratory for approval of their quality and nature. Each sample shall contain not less than 20 kg of material. Granular A and B shall not contain any recycled material (i.e., recycled concrete material, etc.)

.5 Asphalt Paving – HL3, HL3A, or HL8 hot mix asphalt.

.6 During construction, the Engineer may require additional tests of the materials to satisfy themselves that the material being used meets the requirements.

.7 All costs of obtaining, shipping and testing samples shall be borne by the Contractor.

.8 Unit price bid for these items shall include supplying, placing, grading, and compacting the Granular B and Granular A layers for road, sidewalk, driveway base to depths as indicated on the drawing.

1.3 Pavement Design for Park Walkway and Laneway Only

.1 The minimum pavement design for the walkway and laneway shall be as follows:

.1 75 mm HL3

.2 150 mm Granular "A"

.3 300 mm Granular "B"

.2 To confirm the minimum pavement design, a qualified soils consultant shall be engaged by the Consultant to sample, test and design a suitable pavement section. Soil sampling shall be carried out in the presence of the Town Engineer at intervals not exceeding 60 metres along the centerline of the pathway

.3 Copies of all test results and proposed road designs shall be submitted with the Engineering Drawings. In no case will a pavement design less than the minimum Town of Shelburne Standard as shown on the standard drawing for the particular road classification be considered acceptable.

.4 Testing and approval of all granular materials at the designated pits prior to placement and subsequent in-situ verification tests shall also be performed by a Geotechnical Technician.

.5 Prior to the placement of asphalt pavement, the Contractor must submit to the Town Engineer for approval, the asphalt pavement mix designs.

1.4 Construction

.1 **Protection of Trees -** The Contractor should not cut any tree within the property lines of buildings and special attention should be given in the protection of such.

.2 **Removal and Storing of Topsoil** – Contractor shall strip and stockpile topsoil from all surfaces, unless otherwise ordered by the Engineer.

Where practical, the Contractor shall place topsoil on areas adjacent to the road. Topsoil shall be graded to ensure existing drainage is not affected.

.3 **Tolerance of Grading** – Rough grading is defined as all earth moving required to bring the grades to final sub-grade elevation with a tolerance of plus or minus 150 mm for a width extending to within 1.2 metres of the street lines.

Fine grading is defined as earth moving, shaping and consolidating required to bring the grades to accurate sub-grade elevation in preparation for the application of stone base and the construction of curbs and sidewalks. Fine grading shall also include grading of boulevards between curb and streetline, including the 1.2 m strip adjacent to the streetline, omitted from the rough grading operation.

.4 **Grading** – Fill placed over access road shall be placed in layers not exceeding 105 mm and thoroughly compacted by appropriate equipment. Optimum moisture content for proper compaction is to be maintained through the application of water, if necessary.

Edges of cuts and fills are to be neatly sloped at 2H to 1V outside the road allowance.

.5 **Consolidation of Sub-grade** – The Contractor shall be fully responsible for consolidating the sub-grade to a degree of compaction equal to 95% Standard Proctor Density. The Contractor shall include in their price all items such as the removal of soft material from trenches, replacement of material to sub-grade elevation with clean clay, sand or pit run gravel and all costs incidental to the preparation of a firm sub-base surface.

If ordered by the Engineer, the sub-base shall be watered during the process of compaction and charged as part of the compaction, must conform to the required cross-section.

.6 **Balance of Cut and Fill** – The Contractor shall determine from the plans supplied whether a surplus or deficiency of earth will result from their rough and fine grading operations.

Surplus excavations, including topsoil and undesirable material removed below sub-grade, shall be placed in areas adjacent to access road and graded to ensure proper drainage.

Should there be a deficiency of fill available from the construction activities to bring the road to the required grade, the Contractor shall obtain suitable material from approved sources at no additional cost to the project.

.7 **Frozen Ground** – Rough and fine grading operations may be carried out on frozen ground, only with the written permission of the Engineer.

No frozen fill shall be placed in fill sections as it cannot be compacted. Frozen ground in cut sections shall be stockpiled at an approved location and used only when thawed out.

.8 **Sub-Base Approval** – After satisfactory compaction tests have been obtained, the sub-base shall be approved by the Engineer for grade and profile before the granular road base is applied.

.9 **Placing of Road Base** – The Contractor shall exercise due care at all times to prevent the quality of the granular base course material becoming contaminated by clay or other types of deleterious materials. Any such contamination shall be removed, at the Contractor's expense, on the instruction of the Engineer.

Class "A" – All such base course material shall be placed on the sub-grade shaped to proper grade and contour in layers, each to a thickness not greater than 100 mm unless otherwise directed.

Class "C" – The requirements, under placing and spreading, for Class "C" shall be the same as for Class "A". However, in the case of sub-excavations or other conditions, an increased thickness shall be used if specified by the Engineer.

.10 **Rolling and Compacting** – The rate of placing material shall be controlled by the adequacy of the compaction obtained. Regardless of the type of equipment used to deposit and spread the base course material, a minimum of one (1) compacting unit shall be required and maintained in effective operation for each 300 tonnes of material placed per hour. Granular base courses shall be compacted to 100% Standard Proctor Density.

.11 **Final Rolling and Shaping** – After the required thickness has been attained, the surface shall be shaped and compacted by additional rolling and blading as necessary to produce the required contour of the surface. The tolerance in cross-section and longitudinal profile shall be not more that the following at any place on a 3-metre template.

.1 13 mm when the Contract requires a gravel surface only:

.1 The final compacted surfaces of both Class "A" and Class "B" bases will be checked by the Engineer for grade and profile.

.12 **Compaction** – Each layer shall be thoroughly compacted to the satisfaction of the Engineer. In case of controversy, a minimum of 100% of the maximum Proctor density as determined by the MTO procedure, will be required. For the purpose of this Specification, maximum Proctor density shall be determined by dynamic compaction in a cylindrical metal mold 150 mm in diameter and 125 mm in height. The compaction effort shall consist of 55 blows (50 mm drop) of a solid metal hammer weighing 2.5 kg and have a circular striking face 50 mm in diameter on each of three (3) equal layers. Samples which represent the entire gradation of the material shall be used except, in

the case of Class "B" material, the fraction retained on the 25 mm sieve shall be replaced with equal percentage by weight of material of size 25 mm to 13 mm and 13 mm to 4.6 mm.

.13 **Water** –The material shall be sprinkled with water during rolling, tamping and blading when and if directed by the Engineer, either to aid compaction or reduce dust nuisance or both. However, where water is added for compaction, it shall be applied immediately ahead of the compacting unit.

.14 **Maintenance and Repair** – The Contractor shall submit to the Engineer a statement prior to any road construction detailing whether paving or surface treatment is to be done immediately after the road base has been laid, or left until later, then the Contractor shall be responsible for maintenance of the roads during the interim period, and for their repair before paving. Maintenance shall be defined as keeping the travelled roadway in a reasonable state for vehicular traffic at all times, and shall include the repair of any settlement, bog holes, frost boils, etc., which are in the opinion of the Engineer in need of repair for the safe and convenient passage of vehicles. Such maintenance shall be performed by the Contractor within a maximum of 48 hours after being notified by the Engineer.

Repair of the roads shall include all work necessary to make the base surface suitable for paving, including cleaning off dirt introduced by traffic and other means, the accurate adjustment of catch basins, valve chamber and manhole covers, the excavation of soft spots and replacements with fresh stone and the bringing to proper grade and shape of the stone base.

.15 **Surface Drainage** – The Contractor shall maintain all ditches for surface water drainage during construction and shall be responsible for any damage that may be caused by reason of not doing so.

.16 **Inspection of Materials** – The Engineer will at regular intervals require the Contractor to take samples of road materials for test by an approved testing company. These tests and transport of the samples shall be at the expense of the Owner. If the samples do not meet the requirements as specified, then the Engineer may reject the sampled material, which upon rejection will be removed immediately from the site of the work, at the expense of the Contractor.

.17 **Damage to Existing Work** – Where, in the opinion of the Engineer, the Contractor is responsible for damage to curbs, water boxes, hydro poles, catch basins, manholes, culverts, sewers, field drainage tile, watermains, hydrants, valves, etc., the Contractor shall, at their own expense, repair or replace damaged works to the satisfaction of the Engineer. Road material which enters manholes, valve chambers, catch basins and sewers, shall be removed by the Contractor at their own expense.

.18 **Order of Completing the Work** – So that free access to the site will be maintained at all times, the Engineer will direct the Contractor as to the order in which the roads are to be built. Also, where in the opinion of the Engineer ground conditions are not as yet suitable for the construction of either curb or road, or both, the Engineer may order the Contractor to defer construction in that area to a later date, and the Contractor shall not claim additional payment in this respect.

.19 **Water Supply** – Before opening hydrants for the purpose of obtaining water for road sprinkling equipment or for any purpose, the Contractor shall first obtain written permission from the Engineer and take proper precautions against freezing, leaking and other damage.

.20 **Settlement After Construction** – The Contractor shall maintain the access road against all settlement for the duration of the Guarantee Period. The Contractor shall allow for such repairs in the bid process and no extras will be paid for such repairs.

.21 **Cleaning the Site** – After the work on any one section of this Contract has been completed, all debris, excess material and equipment shall be removed by the Contractor and the site left in a neat and workmanlike condition to the satisfaction of the Engineer.

END OF SECTION

02271 – Rip Rap & Filter Cloth

PART 1 - GENERAL

1.1 Scope

.1 This section outlines the requirements for the supply and placement of rip rap and filter cloth to be included with this Contract.

1.2 Reference Standards

.1 OPSS Nos.: 206, 511, 1004, 1860

.2 Conform to Sections of Division 1 as applicable.

PART 2 - MATERIALS

2.1 To OPSS 1004.

PART 3 - EXECUTION

3.1 To OPSS 511.

3.2 Measurement for Payment

.1 To be included in applicable work for which rip rap and filter cloth are required.

END OF SECTION

02723 – Pipe Culverts

PART 1 - GENERAL

1.1 Scope of Work

.1 This section outlines the requirements for the supply and installation of pipe culverts shown on the Contract Drawings.

1.2 Reference Standards

.1 OPSS: 421, 1801

.2 Conform to Sections of Division 1 as applicable.

PART 2 - MATERIALS

2.1 Pipe

.1 The culverts shall be corrugated steel pipe (min. 2.0 mm wall thickness) conforming to the requirements of OPSS 1801. Material shall be compacted to 100% SPD.

2.2 Bedding

.1 Bedding material shall be 150 mm of Granular A conforming to the requirements of OPSS 1010. Material shall be compacted to 100% SPD.

2.3 Cover Material

.1 Cover material extending to 300 mm above the top of the pipe shall be sand.

PART 3 - EXECUTION

3.1 General

.1 To OPSS 421.

3.2 Measurement for Payment

.1 To be included with appropriate work for which pipe culverts are required.

END OF SECTION

1 General

1.1 INSTRUCTIONS

.1 Comply with the Instructions to Bidders, the General Conditions of the Contract and Supplementary Conditions.

.2 Report in writing to the Project Manager any defects of surfaces or work prepared by others which affect the quality or dimensions of the work of this Section. Commencement of work implies complete acceptance of existing conditions and work by others.

1.2 INTENT

.1 Provide all articles, labour, materials, equipment, transportation, hoisting, and incidentals noted, specified, or required to complete the work of this Section.

1.3 SECTION INCLUDES

.1 Provide concrete required to complete the Work in accordance with the Contract Documents, including, but not limited to:

Sidewalks.

Roof amenity terrace.

Courtyard walkway.

Concrete pad for mounting furnishings.

.2 The summarized breakdown of the above-mentioned work does not set out all the work under this Section of the Contract, but rather outlines the essentials. Any concrete work indicated on the drawings or hereinafter specified, whether enumerated above or not, shall be carried out under this Section of work.

1.4 WORK EXCLUDED

.1 Any work in future phases or within civil or structural engineering scope of work.

1.5 ReferenceS

.1 ACI 544.3R-93: Guide for Specifying, Mixing, Placing and Finishing Steel Fibre Reinforced Concrete.

.2 ASTM C1059-99: Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

.3 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction.

.4 CSA A23.2-04: Methods of Test and Standard Practices for Concrete.

.5 CSA A23.3-04: Design of Concrete Structures.

.6 CSA O121-M1978 (R2003): Douglas Fir Plywood.

.7 CSA S269.1-1975 (R2003): Falsework for Construction Purposes.

.8 CAN/CSA-S269.2-M87 (R2003): Access Scaffolding for Construction Purposes.

.9 CSA S269.3-M92 (R2003): Concrete Formwork.

.10 CGSB 41-GP-35M: Polyvinyl Chloride Waterstop.

1.6 SUBMITTALS

.1 All test reports as requested.

.2 Contractor to provide a 600mm x 600mm on site mock-up of concrete paving for decorative concrete paving, finished per specifications for Owner approval prior to starting construction. Location to be determined and may become part of the work.

1.7 RECORD DOCUMENTS

.1 Submit record documents as per the General Requirements.

.2 Record Documents: A set of drawings and specifications shall be kept at the Place of the Work, upon which the Contractor shall record the progress of the concrete installation, giving the time and date of each pour, the date of form removal and a daily record of the environmental conditions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store Products to CSA A23.1.

.2 Store cement and aggregates in a manner to prevent deterioration or intrusion of foreign matter.

.3 Protect liquid mixtures from freezing and from settling out of solution.

.4 Do not use deteriorated or damaged Products for concrete.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Cold Weather Requirements:

.1 When the air temperature is at or below 5°C, or when in the opinion of the Consultant there is a probability of its falling below 5°C within 24 hours of placing, protection for the concrete shall be required for the duration of the curing period by means of heated enclosures, coverings, insulation, or a suitable combination of these methods.

.2 Unvented salamanders or other heaters which produce carbon dioxide as a by-product shall not be permitted in the building during the casting operations or for the following 7 days. Properly vented heaters shall be placed in the building prior to concreting and used to maintain the temperature above 10°C during placing and finishing operations.

.3 When cold weather protection is required for slabs, a thermometer, accurate to plus or minus 2°C, shall be placed on top of the slab near a corner of the pour under the curing blanket to measure the temperature. If the temperature at this position falls below 10°C additional insulating materials and/or heaters shall be used to maintain the temperature above 10°C.

.4 If heaters are used, precautions shall be taken to prevent drying of the slab. During concrete placing, maintain the relative humidity of the atmosphere as high as possible.

.5 No dependence shall be placed on salt or other chemicals for the prevention of freezing.

.6 All reinforcement, forms, and ground with which the concrete is to come in contact shall be free from snow and ice. Concrete shall not be placed on, or against, any surface that will lower the temperature of the concrete in contact with the surface below 10°C.

.7 To avoid a sudden temperature change near the end of the curing period, the protection shall not be completely removed until the concrete has cooled to a temperature differential not greater than 17°C.

.2 Hot Weather Requirements

.1 When the air temperature is at or above 27°C, or when in the opinion of the Consultant there is the probability of it rising above 27°C within 24 hours of placing, facilities shall be provided for the protection of the concrete from the effects of hot and/or drying weather conditions.

.2 The temperature of the concrete when deposited shall not exceed 30°C.

.3 When the rate of evaporation exceeds the limits specified in CSA A23.1/A23.2-non-combined, provide sufficient measures to prevent rapid loss of moisture from the surface of the concrete.

2 Products

2.1 MATERIALS

.1 Plywood: Douglas Fir species, to CSA O121; Sheathing Grade.

.2 Lumber: SPF species, NLGA Light Framing Grade Category, Utility Grade; with grade stamp clearly visible.

.3 Portland Cement: to CAN/CSA-A3001, Type GU.

.4 Blended Hydraulic Cement: to Can/CSA-A3001, Type GUb.

.5 Aggregate: Coarse and fine aggregates to CSA A23.1 and to the concrete mix designs given in this Section.

.6 Water: potable, to CSA A23.1. [Non-potable water may be used if mortar cubes made with the water in question have 7 and 28 day strength equal to at least 90 percent of companion specimens in which potable water was used.]

2.2 ACCESSORIES

.1 Form Release Agent: colourless mineral oil that will not stain concrete.

.2 Fillets for Chamfered Corners: Rigid formed plastic type; 13 x 13 mm size UNO.

.3 Formed Construction Joints: Pre-moulded asphaltic board; tongue and groove profile; 6 mm thick; complete with anchorage.

.4 Dovetail Anchor Slots: Minimum 0.65mm thick galvanized steel; [foam-filled] [non-filled]; release tape sealed slots; bend tab anchors.

.5 Flashing Reglets: Rigid PVC; longest possible lengths; alignments splines for joints.

.6 Void Forms: Moisture resistant treated paper faces; biodegradable; initial set; 100 mm thick.

.7 Wood Texture Mats: Classic Wood texture mat, 207cm x 55.2cm, product ID FM-8700-S/O by Brickform or approved equal.

.8 Admixtures: Air entrainment, chemical and super plasticizing admixtures, to CSA A23.1.

.9 Grout: Masterflow 928 by Degussa or Sealtight V-3 Non-Metallic Grout by W. R. Meadows of Canada Limited.

.10 Below Grade Insulation: rigid extruded polystyrene board insulation, to CAN/ULC-S701, Type 3; sufficient thickness to attain RSI 1.76; Styrofoam by Dow Chemical Canada Inc. or CELFORT by Owens-Corning Canada Ltd.

2.3 GRANULAR BASE AND SUB-BASE COURSES

.1 Granular Blanket: to OPSS 1010, Granular A, free of organic and other deleterious matter; maximum particle size of 20 mm and no more than 15% passing the No. 200 sieve; moisture content within plus or minus 2% of the Moisture Density Relations of Soils to ASTM D698.

.2 Crushed Stone: 12 to 38 mm size, well graded.

.3 Granular Fill: to OPSS 1010, Granular B, Type 1 or 2; moisture content within plus or minus 2% of the Moisture Density Relations of Soils to ASTM D698.

2.4 SEALANTS

.1 Normal Temperature Areas: eg. Loadflex by Sika Canada Inc.

.2 Construction and Expansion Joints in Concrete Walls: Tremco Dymeric or Dow Corning 790 Silicone.

3 Execution

3.1 GENERAL

.1 Relation to Other Sections

.1 Review drawings and specifications for other Sections which will affect the placement of concrete.

.2 Form openings and build in anchors, rolled steel sections, sleeves, inserts, subframes or finished work supplied by other Sections as indicated in the Contract Documents and on Shop Drawings and as required for the proper completion of the Work and Project. These locations are the responsibility of the Trade for whom the sleeve, etc. has been placed.

.3 The Consultant's approval shall be obtained for the size and location of holes which are required in beams for the passage of pipe or ducts, but which are not noted on the Drawings.

.4 Provide grout for setting column and beam bearing plates and co-operate with other Sections in placing thereof. Grout shall be installed in a manner that will ensure positive bearing of the full area of the steel plate on top of the bearing surface.

.5 At the junction of block walls with concrete walls or columns. Provide a continuous vertical dovetail anchor slot in the concrete on the centerline of the wall for its full height.

.6 Pads and Curbs: 100 mm thick, unless otherwise noted, with pad reinforcing of 10M at 300 mm on centres each way and curb reinforcing of 2-15M bars. Dowel pads and curbs to the floor or roof slab with 10M at 300 mm OC each way.

.2 Cast-In-Place Concrete Forming

.1 Construct formwork, shoring and bracing in accordance with CSA S269.3 to meet design and code requirements.

.2 Align joints and make watertight. Keep form joints to a minimum.

.3 When using earth forms, hand trim sides and bottoms, and remove loose dirt prior to placing concrete.

.4 Provide bracing to ensure stability of formwork. Shore or strengthen previously constructed formwork liable to be over stressed by construction loads.

.5 Provide chamfer strips on all external corners.

.6 Apply form release agent prior to placing reinforcing steel, anchoring devices, and embedded items. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent.

.7 Provide formed openings where required for pipes, conduits, sleeves, and other work to be embedded in and passing through concrete members.

.8 Place items which will be cast directly into concrete.

.9 Coordinate work of other sections involved in forming and setting openings, slots, chases, sleeves, bolts, anchors, and other inserts.

.10 Place formed construction joints in pattern pouring sequence. Set top screed to required elevations.

.11 Install void forms in accordance with manufacturer's recommendations.

.12 Formwork Cleaning

Clean forms as erection proceeds, to remove foreign matter.

During cold weather, remove ice and snow from within forms. Do not use calcium chloride or other salt-based de-icing compounds.

.13 Form Removal

Do not remove forms, shores and bracing until concrete has gained sufficient strength to carry its own weight, and construction and design load which are liable to be imposed upon it.

Remove formwork progressively and in accordance with code requirements.

Store removed forms, for exposed architectural concrete, in manner that surfaces to be in contact with fresh concrete will not be damaged.

Restore structural support members where required due to design requirements or construction conditions and as required to permit progressive construction.

Remove forms not directly supporting weight of concrete as soon as stripping operations will not damage concrete.

.3 Concrete Finishing

.1 Exterior finishes

(1) Broom Finish

After float and or Trowel finishing, surfaces to be broom-finished shall be slightly roughed by light brooming with a stiff brush or broom to a uniform non-skid surface to the satisfaction of the Consultant. Textured Broom Finish, when indicated, will have a random swirl, stiff brush finish. Finished surfaces, unless otherwise indicated, shall be true in all planes within 8 mm in 3m as determined by a 3 m straightedge placed anywhere in the concrete.

.4 Construction Joints, Control Joints, and Saw Cuts

.1 Provide construction joints, control joints and saw cuts as shown on the Drawings or in consultation with the Consultant.

.2 All saw cuts shall be made on the day of the finishing operations using “soft-cut” saws. Where saw cuts are not shown on the drawings, maximum grid spacing shall be 5 metres.

.3 At least 5-6 days after placing slab on grade, prior to occupancy, clean all dust and debris from the saw cuts and immediate area and fill the saw cuts with the specified joint filler.

.4 Clean construction joints of dirt and laitance. Saturate joint with water before placing adjacent concrete.

.5 Where shown, at construction joints and control joints in all walls retaining grade, a PVC waterstop shall be provided for the full length of the joint, wired to reinforcing to ensure proper alignment in the concrete and heat welded at all laps and splices in accordance with manufacturer's recommendations. Coordinate placement with concrete work in other sections.

.6 Granular Blanket: Provide a 150 mm layer of Granular 'A' below slab on fill and compact to 90% Standard Proctor maximum dry density.

3.2 CONCRETE

.1 Concrete Proportioning

Proportion concrete to CSA A23.1; Alternative Number 1 of Table 11 as follows:

(1) Proportion normal density concrete to meet the following criteria for concrete in all exterior slabs on grade, and sidewalks.

Cement	:	Type GU
Supplementary Cementing Materials	:	None
Minimum 28 Day Compressive Strength	:	32 MPa
Minimum Cementitious Content	:	as required
Nominal Size of Coarse Aggregate	:	28 mm
Slump Range at Point of Discharge	:	50 to 100 mm
Air content	:	5 to 8%

Water/Cementing Materials Ratio	:	0.45
Exposure Class	:	C-2

(2) Proportion normal density concrete to meet the following criteria for concrete in all exterior heavy duty concrete pavement slabs & curbs.

Cement	:	Type GU
Supplementary Cementing Materials	:	None
Minimum 28 Day Compressive Strength	:	35 MPa
Minimum Cementitious Content	:	335 kg/m3
Nominal Size of Coarse Aggregate	:	28 mm
Slump Range at Point of Discharge	:	50 to 100 mm
Air content	:	5 to 8%
Water/Cementing Materials Ratio	:	0.45

Submit mix designs to the Consultant for review. Number each design to conform to the design requirement numbering above. Where the use of supplementary cementing materials is permitted, specify which materials and what quantities are proposed.

The use of supplementary cementing materials, where permitted by the mix design, shall conform to CAN/CSA-A3001.

Where a high range water reducing admixture (superplasticizer) is used, the slump shall not exceed 240 mm.

Mix design for concrete placed by pump shall take into consideration the pump equipment and shall not exceed the specified water/cementing materials ratio.

.2 Admixtures

.1 An approved water reducing admixture may be used in all concrete if compatible with all other specified admixtures. The use of a high range water reducing admixture (superplasticizer) is required for steel fibre reinforced concrete.

.2 Entrained air in non-air entrained concrete shall be less than 3%.

.3 An air entraining agent shall be used in all concrete which will be exposed to freeze-thaw conditions and for the action of road salt to CSA A23.1.

.4 Coloured concrete: N/A.

.5 All admixtures shall be used according to the manufacturer's recommendations and shall be identified in the submitted mix design.

.3 Preparation of Equipment and Place of Deposit

.1 A slump cone shall be made available at the delivery point and slump tests taken whenever requested. No concrete shall be poured unless a slump cone is on the site.

.2 Equipment for the mixing and transportation of concrete and the place of deposition shall be cleaned of all debris and ice. Masonry that will be in contact with concrete shall be well drenched (except in freezing weather). The reinforcement shall be thoroughly cleaned of ice, dirt, oil, scale or the coatings that tend to reduce the bond.

.3 Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Consultant. All laitance and other unsound material shall be removed from hardened concrete before additional concrete is added.

.4 Prepare concrete slabs designated to receive bonded topping slabs to CSA A23.1.

.4 Mixing: Mix and deliver ready-mixed concrete to CSA A23.1.

.5 Conveying

.1 Convey concrete to CSA A23.1.

.2 Convey concrete from the mixer to the place of final deposit by methods that will prevent separation or loss of materials.

.3 Equipment for chuting, pumping and pneumatically conveying concrete shall be such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.4 When conveying concrete by pump, the slump, as measured at delivery to the pump, shall not be increased by more than 25 mm above the maximum slump given. Maintain specified water-to-cement ratio.

.6 Placing

.1 Placing concrete to CSA A23.1.

.2 Place bonded topping slabs to CSA A23.1.

.3 Notify Consultant at least 24 hours in advance of the proposed time of commencement of concreting.

.4 Conform to ACI 544.3R-93 for placing and finishing steel fibre reinforced concrete.

.5 Deposit concrete as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. The placing of concrete shall be carried on at such a rate that concrete is always plastic and flows readily into the spaces between the bars. No concrete that has been contaminated by foreign material shall be used, nor shall retempered concrete be used unless approved by the Consultant.

.6 Once placing has started, it shall be carried on as a continuous operation until placement of the panel or section is completed. Construct construction joints as indicated on Drawings.

.7 Thoroughly consolidate concrete by vibration or suitable means during placement. It shall be thoroughly worked around reinforcement and embedded fixtures and into the corners of the forms. Vibrators shall not be used to move concrete horizontally.

.8 Beams and girders, column capitals and haunches shall be placed monolithically without horizontal joints in their depths unless specifically indicated otherwise on the drawings.

.9 After suitable bulkheads, screeds and, if specified, jointing materials have been positioned, the concrete shall be placed continuously between construction joints, beginning at a bulkhead, edge form or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of the previously placed to avoid cold joints. Concrete shall be distributed by shovels and consolidated by vibration or other suitable means. The concrete shall then be brought to correct level with a straight-edge and struck off. Bullfloats or darbies shall be used to smooth the surface leaving it free of bumps or hollows.

.7 Curing

.1 Cure concrete to CSA A23.1.

.2 Refer to Section 03 39 00 for curing horizontal concrete surfaces.

.3 Curing exposed surfaces shall commence as soon as the concrete has hardened sufficiently to prevent surface damage. Curing of concrete surfaces shall be achieved using one or more of the following methods:

(1) ponding or continuous sprinkling;
(2) absorptive mat or fabric kept continuously wet;
(3) 4 mil polyethylene plastic film;
(4) forms in contact with concrete surface; or
(5) other moisture-retaining methods as approved by the Consultant.

.4 Film forming curing compound is not an acceptable substitute for the methods noted above.

.5 All concrete surfaces shall be moist cured for a basic curing period of either three days at a minimum temperature of 10 °C or for the time necessary to attain 35% of the specified 28-day compressive strength of the concrete.

.6 Cure air-entrained concrete an additional four consecutive days (for a total of seven days) at a minimum temperature of 10°C or for the time necessary to attain 70% of the specified 28-day compressive strength of the concrete.

.7 The basic curing time shall be extended on all structural concrete until the concrete has achieved sufficient strength for structural safety. (70% of the specified 28 day compressive strength of the concrete unless otherwise directed by the Consultant.)

.8 When the air temperature is above 27°C, cure concrete to CSA A23.1.

.9 During freezing weather, water curing of concrete shall be terminated 12 hours before the end of the protection period.

3.3 CLEANING

.1 Concrete which is to be covered by other material shall have all wires and large fins cut off, projecting metal ties cut back 25 mm behind the surface. Void holes and cavities shall be filled with mortar, honeycomb shall be cut out and spaced filled with concrete. Serious honeycomb shall be inspected by the Consultant and the method of rectifying the condition approved before it is repaired. The surface shall be left reasonably smooth and even.

.2 The surface of all exposed concrete walls, columns, and beams (interior and exterior) shall be treated as specified above. In addition, immediately after the forms have been removed, grind the surface using only carborundum brick and cement slurry to take out marks and other irregularities. Leave the surface in a condition equivalent to a finish coat of cement plaster.

3.4 PROTECTION

.1 Protect freshly cast concrete from surrounding environment, and from future construction operations to CSA A23.1.

.2 Provide necessary protection to maintain concrete temperature above 10°C for the curing period.

.3 During extremes in weather, floors shall not be placed unless the slab is protected by a roof and other suitable protective measures can be taken.

3.5 FIELD QUALITY CONTROL

.1 Routine testing of materials, of proposed mix designs and of resulting concrete for compliance with technical requirements of the Specifications will be carried out by the Inspection and Testing Company as specified in Section 01 45 00.

.2 If instructed by the Consultant, the Inspection Company shall secure production samples of materials at the plant or stock piles during the course of the work and test for compliance with the Contract Documents.

.3 General

Sample and test concrete to CSA A23.2.

Do not add water after the initial introduction of the mixing water for the batch, except at the start of discharge, when the measured slump of the concrete is less than that specified and no more than 60 minutes have elapsed from the time of batching to the start of discharge. In this case, an amount not exceeding 16 L/m or 10% of the mix design water may be added. The drum or blades shall then be turned an additional 30 revolutions or more if necessary at mixing speed. Water shall not be added to the batch at any later time.

Do not add water to concrete in agitators that are not equipped as mixers.

Concrete may be used as long as it is of such slump that, in the opinion of the Consultant, it can be placed and properly consolidated without the addition of water to the batch, but in no case shall the time between batching and complete discharge exceed 120 min.

The Inspection and Testing Company shall report the details of each occurrence to the Consultant whenever concrete that does not meet the Contract Documents is placed.

Concrete that is rejected by the Inspection and Testing Company that has not had water added or which had water added by the concrete Supplier shall be at the expense of the Supplier. Concrete that is rejected after water is added at the Contractor's insistence shall be at the Contractor's expense.

.4 Concrete Compressive Strength Tests

A technician shall make at least three (3) compression-test specimens for each day's concrete placement but not less than three (3) cylinders for each 100 cu.m. of individual placement. There shall be no less than one set of three cylinders for each concrete mix design placed on any one day. One cylinder shall be tested at seven (7) days and one at twenty-eight (28) days. Additional test specimens may be taken at the discretion of the Consultant.

If either of the two (2) of the 28 day tests do not meet specified requirements, then the third cylinder should be tested at 56 days.

Additional cylinders may be cast at the expense of the Contractor if the Contractor requests them. The timing of tests on these extra cylinders shall be as required by the Contractor.

The results of the tests shall conform to strength requirements outlined in Clause 17.5 of CSA A23.1 and if they fail to do so the Consultant may require one or more of the procedures outlined in Clause 17.5.8 of the same standard.

.5 Concrete Slump Tests

A technician shall make standard slump tests as directed by the Consultant. A slump test shall be made with every strength test.

Water may be added to any concrete whose slump is less than the specified slump, however, the Inspection and Testing Company shall reject any concrete that has, after the addition of water, a slump greater than the specified slump.

Any concrete to which water has been added shall have its slump checked and the water quantity and slump shall be recorded by the Inspection and Testing Company.

Any concrete with a slump greater than that specified shall have a set of three cylinders cast and the exact location of the concrete in the structure recorded by the Inspection and Testing Company.

Any concrete failing to meet the specified slump requirements shall be rejected by the Inspection and Testing Company.

.6 Entrained Air Tests

Air content measurements of air-entrained concrete shall be made for each load of air entrained concrete deposited.

Concrete subject to exposure classifications F-1 and C-1 when exposed to freezing and thawing and C-2 of Tables 7 and 8 of CSA A23.1 shall be retested for conformance to air content requirements when more than 90 minutes have elapsed since batching.

.7 Concrete Slab Quality Control

The Inspection and Testing Company shall be on-site full time during the pouring of all slabs to ensure the quality of the concrete being installed. In addition to the requirements of Clause 3.3.2 - Concrete Strength Tests, a slump test shall be made for each truck.

For slabs on grade containing steel fibres, the Inspection and Testing Company shall monitor on site, to ensure that the amount of fibres added meets the specification.

For concrete to which a high range water reducing admixture (superplasticizer) is to be added, the Inspection and Testing Company shall take a slump test on a sample obtained before the superplasticizer is added. Should the slump be outside the specified range, the Supplier has the following options:

(1) If the slump is less than the specified range;
- water may be added to increase the slump to the lower slump range value after which the superplasticizer is added, or
- additional superplasticizer alone may be added to bring the concrete up to the desired consistency.

(2) If the slump is greater than the specified range;
- the batch can be allowed to dry in the truck if sufficient time remains from the batch time and weather conditions are conducive, after which another slump test shall be taken, or
- the supplier may elect to discharge to a container (loader bucket, etc.) or waste the first 10% of the load after which another sample shall be taken and slump test performed.

(3) Failure of the option 2(b) slump test does not prevent subsequently utilizing option 2(a), however, any cost of clean-up of the discharged concrete shall be borne by the supplier.

For the first loads deposited that contain steel fibres, a sample shall be taken from the first quarter of the load and the steel fibres, washed out, collected, and weighed to ensure proper distribution of the fibres throughout the concrete.

Should the steel fibre density fall outside 10% of the required value, adjustments shall be made to the method of addition, to the duration of mixing or as required to achieve proper distribution.

Adjustments and samples shall be taken from each load until two successive loads are mixed within the specified tolerance.

END OF SECTION

PART 1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the Instructions to Bidders, the General Conditions of the Contract and Supplementary Conditions.

.2 Report in writing to the Project Manager any defects of surfaces or work prepared by others which affect the quality or dimensions of the work of this Section. Commencement of work implies complete acceptance of existing conditions and work by others.

1.2 INTENT

.1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.3 SECTION INCLUDES

.1 Provide concrete required to complete the Work in accordance with the Contract Documents, including, but not limited to:

Cast-in-place concrete at site on grade, ground floor courtyard, and roof amenity terrace;

Concrete slabs on grade;

Footings for site furnishings;

Concrete pads for benches;

Miscellaneous concrete items;

Control joints and construction joints;

Expansion joints;

Admixtures;

Crushed stone under slabs, and

Granular 'A' fill under slabs.

.2 The summarized breakdown of the above mentioned work does not set out all the work under this Section of the Contract, but rather outlines the essentials. Any landscape concrete work, indicated on the landscape drawings or hereinafter specified, whether enumerated above or not, shall be carried out under this Section of work.

1.5 REFERENCES

.1 ACI 544.3R-93: Guide for Specifying, Mixing, Placing and Finishing Steel Fibre Reinforced Concrete.

.2 ASTM C1059-99: Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

.3 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction.

.4 CSA A23.2-04: Methods of Test and Standard Practices for Concrete.

.5 CSA A23.3-04: Design of Concrete Structures.

.6 CSA O121-M1978 (R2003): Douglas Fir Plywood.

.7 CSA S269.1-1975 (R2003): Falsework for Construction Purposes.

.8 CAN/CSA-S269.2-M87 (R2003): Access Scaffolding for Construction Purposes.

.9 CSA S269.3-M92 (R2003): Concrete Formwork.

.10 CGSB 41-GP-35M: Polyvinyl Chloride Waterstop.

1.6 SUBMITTALS

.1 All test reports as requested.

.2 Contractor to provide a 600mm x 600mm mock-up of decorative concrete paving for landscape architect approval prior to starting construction.

1.7 RECORD DOCUMENTS

.1 Submit record documents as per the General Requirements.

.2 Record Documents: A set of drawings and specifications shall be kept at the Place of the Work, upon which the Contractor shall record the progress of the concrete installation, giving the time and date of each pour, the date of form removal and a daily record of the environmental conditions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store Products to CSA A23.1.

.2 Store cement and aggregates in a manner to prevent deterioration or intrusion of foreign matter.

.3 Protect liquid mixtures from freezing and from settling out of solution.

.4 Do not use deteriorated or damaged Products for concrete.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Cold Weather Requirements

When the air temperature is at or below 5°C, or when in the opinion of the Consultant there is a probability of its falling below 5°C within 24 hours of placing, protection for the concrete shall be required for the duration of the curing period by means of heated enclosures, coverings, insulation, or a suitable combination of these methods.

Unvented salamanders or other heaters which produce carbon dioxide as a by-product shall not be permitted in the building during the casting operations or for the following 7 days. Properly vented heaters shall be placed in the building prior to concreting and used to maintain the temperature above 10°C during placing and finishing operations.

When cold weather protection is required for slabs, a thermometer, accurate to plus or minus 2°C, shall be placed on top of the slab near a corner of the pour under the curing blanket to measure the temperature. If the temperature at this position falls below 10°C additional insulating materials and/or heaters shall be used to maintain the temperature above 10°C.

If heaters are used, precautions shall be taken to prevent drying of the slab. During concrete placing, maintain the relative humidity of the atmosphere as high as possible.

No dependence shall be placed on salt or other chemicals for the prevention of freezing.

All reinforcement, forms, and ground with which the concrete is to come in contact shall be free from snow and ice. Concrete shall not be placed on, or against, any surface that will lower the temperature of the concrete in contact with the surface below 10°C.

To avoid a sudden temperature change near the end of the curing period, the protection shall not be completely removed until the concrete has cooled to a temperature differential not greater than 17°C.

.2 Hot Weather Requirements

When the air temperature is at or above 27°C, or when in the opinion of the Consultant there is the probability of it rising above 27°C within 24 hours of placing, facilities shall be provided for the protection of the concrete from the effects of hot and/or drying weather conditions.

The temperature of the concrete when deposited shall not exceed 30°C.

.3 When the rate of evaporation exceeds the limits specified in CSA A23.1/A23.2-non-combined. Provide sufficient measures to prevent rapid loss of moisture from the surface of the concrete.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Plywood: Douglas Fir species, to CSA O121; Sheathing Grade.

.2 Lumber: SPF species, NLGA Light Framing Grade Category, Utility Grade; with grade stamp clearly visible.

.3 Steel Forms: steel sheet, well matched, tight fitting, and adequately stiffened to support weight of concrete without deflection.

.4 Fibre Glass Reinforced Resin Forms: matched, tight fitting, and adequately stiffened to support weight of concrete without deflection.

.5 Pan Forms: Removable; of sizes and profiles required.

.6 Tubular Column Type Forms: spirally wound, adhesive laminated fibre paper tube forms, coated with hot wax; diameters as required; Handiform or Permaform by Perma Tubes Ltd. or Sonotube by Sonoco Limited.

.7 Portland Cement: to CAN/CSA-A3001, Type GU.

.8 Blended Hydraulic Cement: to Can/CSA-A3001, Type GUb.

.9 Aggregate: Coarse and fine aggregates to CSA A23.1 and to the concrete mix designs given in this Section.

.10 Water: potable, to CSA A23.1. [Non-potable water may be used if mortar cubes made with the water in question have 7 and 28 day strength equal to at least 90 percent of companion specimens in which potable water was used.]

.11 Concrete paving to be broom finish. Refer to Landscape Drawings for paving locations.

2.2 ACCESSORIES

.1 Form Ties: removable or snap-off metal type of fixed and adjustable length, with cones and neoprene plugs when used for exposed conditions; to CSA S269.3.

.2 Form Release Agent: colourless mineral oil that will not stain concrete.

.3 Fillets for Chamfered Corners: Rigid formed plastic type; 13 x 13 mm size UNO.

.4 Formed Construction Joints: Premoulded asphaltic board; tongue and groove profile; 6 mm thick; complete with anchorage.

.5 Waterstops: Purpose made polyvinyl chloride, to CGSB 41-GP-35M, Type II; or flexible expanding sodium bentonite based for concrete construction joints.

.6 Dovetail Anchor Slots: Minimum 0.65mm thick galvanized steel; [foam-filled][non-filled]; release tape sealed slots; bend tab anchors.

.7 Flashing Reglets: Rigid PVC; longest possible lengths; alignments splines for joints.

.8 Void Forms: Moisture resistant treated paper faces; biodegradable; initial set; 100 mm thick.

.9 Wood Texture Mats: Classic Wood texture mat, 207cm x 55.2cm, product ID FM-8700-S/O by Brickform or approved equal.

.10 Concrete Reinforcement: as specified in Section 32 13 16.

.11 Admixtures: Air entrainment, chemical and super plasticizing admixtures, to CSA A23.1.

.12 Grout: Masterflow 928 by Degussa or Sealtight V-3 Non-Metallic Grout by W. R. Meadows of Canada Limited.

.13 Below Grade Insulation: rigid extruded polystyrene board insulation, to CAN/ULC-S701, Type 3; sufficient thickness to attain RSI 1.76; Styrofoam by Dow Chemical Canada Inc. or CELFORT by Owens-Corning Canada Ltd.

2.3 GRANULAR BASE AND SUB-BASE COURSES

.1 Granular Blanket: to OPSS 1010, Granular A; free of organic and other deleterious matter; maximum particle size of 20 mm and no more than 15% passing the No. 200 sieve; moisture content within plus or minus 2% of the Moisture Density Relations of Soils to ASTM D698.

.2 Crushed Stone: 12 to 38 mm size, well graded.

.3 Granular Fill: to OPSS 1010, Granular B, Type 1 or 2; moisture content within plus or minus 2% of the Moisture Density Relations of Soils to ASTM D698.

2.4 SEALANTS

.1 Normal Temperature Areas: eg. Loadflex by Sika Canada Inc.

Refrigerated and Freezer Areas: eg. Chemtron 2035 by Chemtron Polymer Inc.

.2 Construction and Expansion Joints in Concrete Walls: Tremco Dymeric or Dow Corning 790 Silicone.

PART 3 EXECUTION

3.1 GENERAL

.1 Relation to Other Sections

Review drawings and specifications for other Sections which will affect the placement of concrete.

Form openings and build in anchors, rolled steel sections, sleeves, inserts, subframes or finished work supplied by other Sections as indicated in the Contract Documents and on Shop Drawings and as required for the proper completion of the Work and Project. These locations are the responsibility of the Trade for whom the sleeve, etc. has been placed.

The Consultant's approval shall be obtained for the size and location of holes which are required in beams for the passage of pipe or ducts but which are not noted on the Drawings.

Provide grout for setting column and beam bearing plates and co-operate with other Sections in placing thereof. Grout shall be installed in a manner that will ensure positive bearing of the full area of the steel plate on top of the bearing surface.

.2 Cast-In-Place Concrete Forming

.1 Construct formwork, shoring and bracing in accordance with CSA S269.3 to meet design and code requirements.

.2 Align joints and make watertight. Keep form joints to a minimum.

.3 When using earth forms, hand trim sides and bottoms, and remove loose dirt prior to placing concrete.

.4 Provide bracing to ensure stability of formwork. Shore or strengthen previously constructed formwork liable to be over stressed by construction loads.

.5 Provide chamfer strips on all external corners.

.6 Apply form release agent prior to placing reinforcing steel, anchoring devices, and embedded items. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent.

.7 Provide formed openings where required for pipes, conduits, sleeves, and other work to be embedded in and passing through concrete members.

.8 Place items which will be cast directly into concrete.

.9 Coordinate work of other sections involved in forming and setting openings, slots, chases, sleeves, bolts, anchors, and other inserts.

.10 Install waterstops continuous without displacing reinforcement. Heat seal joints watertight.

.11 Place formed construction joints in pattern pouring sequence. Set top screed to required elevations.

.12 Install void forms in accordance with manufacturer's recommendations.

.13 Formwork Cleaning

Clean forms as erection proceeds, to remove foreign matter.

During cold weather, remove ice and snow from within forms. Do not use calcium chloride or other salt-based de-icing compounds.

.14 Form Removal

Do not remove forms, shores and bracing until concrete has gained sufficient strength to carry its own weight, and construction and design load which are liable to be imposed upon it.

Remove formwork progressively and in accordance with code requirements.

Store removed forms, for exposed architectural concrete, in manner that surfaces to be in contact with fresh concrete will not be damaged.

Restore structural support members where required due to design requirements or construction conditions and as required to permit progressive construction.

Remove forms not directly supporting weight of concrete as soon as stripping operations will not damage concrete.

.3 Construction Joints, Control Joints, and Saw Cuts

Provide construction joints, control joints and saw cuts as shown on the Drawings or in consultation with the Consultant.

All saw cuts shall be made on the day of the finishing operations using “soft-cut” saws. Where saw cuts are not shown on the drawings, maximum grid spacing shall be 5 metres.

At least 5-6 days after placing slab on grade, prior to occupancy, clean all dust and debris from the saw cuts and immediate area and fill the saw cuts with the specified joint filler.

Clean construction joints of dirt and laitance. Saturate joint with water before placing adjacent concrete.

Where shown, at construction joints and control joints in all walls retaining grade, a PVC waterstop shall be provided for the full length of the joint, wired to reinforcing to ensure proper alignment in the concrete and heat welded at all laps and splices in accordance with manufacturer's recommendations. Coordinate placement with Section 32 13 15.

Granular Blanket: Provide a 150 mm layer of Granular 'A' below slab on fill and compact to 98% Standard Proctor maximum dry density.

3.2 CONCRETE

.1 Concrete Proportioning

Proportion concrete to CSA A23.1; Alternative Number 1 of Table 11 as follows:

(1) Proportion normal density concrete to meet the following criteria for concrete in all exterior slabs on grade, and sidewalks.

Cement	:	Type GU
Supplementary Cementing Materials	:	None
Minimum 28 Day Compressive Strength	:	32 MPa
Minimum Cementitious Content	:	as required
Nominal Size of Coarse Aggregate	:	28 mm
Slump Range at Point of Discharge	:	50 to 100 mm
Air content	:	5 to 8%

Water/Cementing Materials Ratio	:	0.45
Exposure Class	:	C-2

Submit mix designs to the Consultant for review. Number each design to conform to the design requirement numbering above. Where the use of supplementary cementing materials is permitted, specify which materials and what quantities are proposed.

The use of supplementary cementing materials, where permitted by the mix design, shall conform to CAN/CSA-A3001.

Where a high range water reducing admixture (superplasticizer) is used, the slump shall not exceed 240 mm.

Mix design for concrete placed by pump shall take into consideration the pump equipment and shall not exceed the specified water/cementing materials ratio.

.2 Admixtures

An approved water reducing admixture may be used in all concrete if compatible with all other specified admixtures. The use of a high range water reducing admixture (superplasticizer) is required for steel fibre reinforced concrete.

Entrained air in non-air entrained concrete shall be less than 3%.

An air entraining agent shall be used in all concrete which will be exposed to freeze-thaw conditions and for the action of road salt to CSA A23.1.

All admixtures shall be used according to the manufacturer's recommendations, and shall be identified in the submitted mix design.

.3 Preparation of Equipment and Place of Deposit

A slump cone shall be made available at the delivery point and slump tests taken whenever requested. No concrete shall be poured unless a slump cone is on the site.

Equipment for the mixing and transportation of concrete and the place of deposition shall be cleaned of all debris and ice. Masonry that will be in contact with concrete shall be well drenched (except in freezing weather). The reinforcement shall be thoroughly cleaned of ice, dirt, oil, scale or the coatings that tend to reduce the bond.

Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Consultant. All laitance and other unsound material shall be removed from hardened concrete before additional concrete is added.

Prepare concrete slabs designated to receive bonded topping slabs to CSA A23.1.

.4 Mixing: Mix and deliver ready-mixed concrete to CSA A23.1.

.5 Conveying

Convey concrete to CSA A23.1.

Convey concrete from the mixer to the place of final deposit by methods that will prevent separation or loss of materials.

Equipment for chuting, pumping and pneumatically conveying concrete shall be such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials.

When conveying concrete by pump, the slump, as measured at delivery to the pump, shall not be increased by more than 25 mm above the maximum slump given. Maintain specified water-to-cement ratio.

.6 Placing

Placing concrete to CSA A23.1.

Place bonded topping slabs to CSA A23.1.

Notify Consultant at least 24 hours in advance of the proposed time of commencement of concreting.

Conform to ACI 544.3R-93 for placing and finishing steel fibre reinforced concrete.

Deposit concrete as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. The placing of concrete shall be carried on at such a rate that concrete is at all times plastic and flows readily into the spaces between the bars. No concrete that has been contaminated by foreign material shall be used, nor shall retempered concrete be used unless approved by the Consultant.

Once placing has started, it shall be carried on as a continuous operation until placement of the panel or section is completed. Construct construction joints as indicated on Drawings.

Thoroughly consolidate concrete by vibration or suitable means during placement. It shall be thoroughly worked around reinforcement and embedded fixtures and into the corners of the forms. Vibrators shall not be used to move concrete horizontally.

Beams and girders, column capitals and haunches shall be placed monolithically without horizontal joints in their depths unless specifically indicated otherwise on the drawings.

After suitable bulkheads, screeds and, if specified, jointing materials have been positioned, the concrete shall be placed continuously between construction joints, beginning at a bulkhead, edge form or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of the previously placed to avoid cold joints. Concrete shall be distributed by shovels and consolidated by vibration or other suitable means. The concrete shall then be brought to correct level with a straight-edge and struck off. Bullfloats or darbies shall be used to smooth the surface leaving it free of bumps or hollows.

.15 Curing

Cure concrete to CSA A23.1.

Refer to Section 32 13 17 for curing horizontal concrete surfaces.

Curing exposed surfaces shall commence as soon as the concrete has hardened sufficiently to prevent surface damage. Curing of concrete surfaces shall be achieved using one or more of the following methods:

(1) ponding or continuous sprinkling;
(2) absorptive mat or fabric kept continuously wet;
(3) 4 mil polyethylene plastic film;
(4) forms in contact with concrete surface; or
(5) other moisture-retaining methods as approved by the Consultant.

Film forming curing compound is not an acceptable substitute for the methods noted above.

All concrete surfaces shall be moist cured for a basic curing period of either three days at a minimum temperature of 10 °C or for the time necessary to attain 35% of the specified 28 day compressive strength of the concrete.

Cure air-entrained concrete an additional four consecutive days (for a total of seven days) at a minimum temperature of 10°C or for the time necessary to attain 70% of the specified 28 day compressive strength of the concrete.

The basic curing time shall be extended on all structural concrete until the concrete has achieved sufficient strength for structural safety. (70% of the specified 28 day compressive strength of the concrete unless otherwise directed by the Consultant.)

When the air temperature is above 27°C, cure concrete to CSA A23.1.

During freezing weather, water curing of concrete shall be terminated 12 hours before the end of the protection period.

3.3 CLEANING

.1 Concrete which is to be covered by other material shall have all wires and large fins cut off, projecting metal ties cut back 25 mm behind the surface. Void holes and cavities shall be filled with mortar, honeycomb shall be cut out and spaced filled with concrete. Serious honeycomb shall be inspected by the Consultant and the method of rectifying the condition approved before it is repaired. The surface shall be left reasonably smooth and even.

.2 The surface of all exposed concrete walls, columns, and beams (interior and exterior) shall be treated as specified above. In addition, immediately after the forms have been removed, grind the surface using only carborundum brick and cement slurry to take out marks and other irregularities. Leave the surface in a condition equivalent to a finish coat of cement plaster.

3.4 PROTECTION

.1 Protect freshly cast concrete from surrounding environment, and from future construction operations, to CSA A23.1.

.2 Provide necessary protection to maintain concrete temperature above 10°C for the curing period.

.3 During extremes in weather, floors shall not be placed unless the slab is protected by a roof and other suitable protective measures can be taken.

3.5 FIELD QUALITY CONTROL

.1 Routine testing of materials, of proposed mix designs and of resulting concrete for compliance with technical requirements of the Specifications will be carried out by the Inspection and Testing Company appointed by the Consultant, as specified in Division 00100 Section 14.0.

.2 If instructed by the Consultant, the Inspection Company shall secure production samples of materials at the plant or stock piles during the course of the work and test for compliance with the Contract Documents.

.3 General

Sample and test concrete to CSA A23.2.

Do not add water after the initial introduction of the mixing water for the batch, except at the start of discharge, when the measured slump of the concrete is less than that specified and no more than 60 minutes have elapsed from the time of batching to the start of discharge. In this case, an amount not exceeding 16 L/m or 10% of the mix design water may be added. The drum or blades shall then be turned an additional 30 revolutions or more if necessary at mixing speed. Water shall not be added to the batch at any later time.

Do not add water to concrete in agitators that are not equipped as mixers.

Concrete may be used as long as it is of such slump that, in the opinion of the Consultant, it can be placed and properly consolidated without the addition of water to the batch, but in no case shall the time between batching and complete discharge exceed 120 min.

The Inspection and Testing Company shall report the details of each occurrence to the Consultant whenever concrete that does not meet the Contract Documents is placed.

Concrete that is rejected by the Inspection and Testing Company that has not had water added or which had water added by the concrete Supplier shall be at the expense of the Supplier. Concrete that is rejected after water is added at the Contractor's insistence shall be at the Contractor's expense.

.4 Concrete Compressive Strength Tests

A technician shall make at least three (3) compression-test specimens for each day's concrete placement but not less than three (3) cylinders for each 100 cu.m. of individual placement. There shall be no less than one set of three cylinders for each concrete mix design placed on any one day. One cylinder shall be tested at seven (7) days and one at twenty-eight (28) days. Additional test specimens may be taken at the discretion of the Consultant.

If either of the two (2) of the 28 day tests do not meet specified requirements, then the third cylinder should be tested at 56 days.

Additional cylinders may be cast at the expense of the Contractor if the Contractor requests them. The timing of tests on these extra cylinders shall be as required by the Contractor.

The results of the tests shall conform to strength requirements outlined in Clause 17.5 of CSA A23.1 and if they fail to do so the Consultant may require one or more of the procedures outlined in Clause 17.5.8 of the same standard.

.5 Concrete Slump Tests

A technician shall make standard slump tests as directed by the Consultant. A slump test shall be made with every strength test.

Water may be added to any concrete whose slump is less than the specified slump, however, the Inspection and Testing Company shall reject any concrete that has, after the addition of water, a slump greater than the specified slump.

Any concrete to which water has been added shall have its slump checked and the water quantity and slump shall be recorded by the Inspection and Testing Company.

Any concrete with a slump greater than that specified shall have a set of three cylinders cast and the exact location of the concrete in the structure recorded by the Inspection and Testing Company.

Any concrete failing to meet the specified slump requirements shall be rejected by the Inspection and Testing Company.

.6 Entrained Air Tests

Air content measurements of air-entrained concrete shall be made for each load of air entrained concrete deposited.

Concrete subject to exposure classifications F-1 and C-1 when exposed to freezing and thawing and C-2 of Tables 7 and 8 of CSA A23.1 shall be retested for conformance to air content requirements when more than 90 minutes have elapsed since batching.

.7 Concrete Slab Quality Control

The Inspection and Testing Company shall be on-site full time during the pouring of all slabs to ensure the quality of the concrete being installed. In addition to the requirements of Clause 3.3.2 - Concrete Strength Tests, a slump test shall be made for each truck.

For slabs on grade containing steel fibres, the Inspection and Testing Company shall monitor on site, to ensure that the amount of fibres added meets the specification.

For concrete to which a high range water reducing admixture (superplasticizer) is to be added, the Inspection and Testing Company shall take a slump test on a sample obtained before the superplasticizer is added. Should the slump be outside the specified range, the Supplier has the following options:

(1) If the slump is less than the specified range;
- water may be added to increase the slump to the lower slump range value after which the superplasticizer is added, or
- additional superplasticizer alone may be added to bring the concrete up to the desired consistency.

(2) If the slump is greater than the specified range;
- the batch can be allowed to dry in the truck if sufficient time remains from the batch time and weather conditions are conducive, after which another slump test shall be taken, or
- the supplier may elect to discharge to a container (loader bucket, etc.) or waste the first 10% of the load after which another sample shall be taken and slump test performed.

(3) Failure of the option 2(b) slump test does not prevent subsequently utilizing option 2(a), however, any cost of clean-up of the discharged concrete shall be borne by the supplier.

For the first loads deposited that contain steel fibres, a sample shall be taken from the first quarter of the load and the steel fibres, washed out, collected and weighed to ensure proper distribution of the fibres throughout the concrete.

Should the steel fibre density fall outside 10% of the required value, adjustments shall be made to the method of addition, to the duration of mixing or as required to achieve proper distribution.

Adjustments and samples shall be taken from each load until two successive loads are mixed within the specified tolerance.

END OF SECTION

1.0 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements.

.2 Report in writing to the Project Manager any defects of surfaces or work prepared by others which affect the quality or dimensions of the work of this Section. Commencement of work implies complete acceptance of existing conditions and previous work performed by others.

1.2 INTENT

.1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.3 SECTION INCLUDES

.1 Provide all concrete forms and accessories for concrete.

1.4 WORK EXCLUDED

.1 This Contractor shall not be responsible for the formwork necessary to construct the following:

1.4.1.1 Light standard bases.
1.4.1.2 Concrete encasement for electrical duct banks.
1.4.1.3 Precast concrete items.
1.4.1.4 All below frost footings and foundations.
1.4.1.5 All decorative above grade exposed concrete

1.5 MATERIALS INSTALLED IN THIS SECTION BUT FURNISHED BY OTHERS

.1 Build into the concrete forms, all required items furnished by others, including, but not limited to:

1.5.1.1 Concrete inserts, hangers, anchors, sleeves, bolts, etc.
1.5.1.2 Drain openings.
1.5.1.3 Leveller pit frames and conduits.
1.5.1.4 Rough opening frames and bucks occurring in the concrete work.
1.5.1.5 Flashing in concrete work.
1.5.1.6 Grate sinkages, angle frames, nosings, curb channels, etc.

1.6 RELATED SECTIONS

.1 Section 32 13 16 – Concrete Reinforcement.

.2 Section 32 13 14 – Cast-in-Place Concrete.

.3 Section 32 13 17 – Concrete Finishing.

1.7 REFERENCES

.1 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction.

.2 .CSA O121-M1978 (R2003): Douglas Fir Plywood.

.3 CSA S269.1-1975 (R2003): Falsework for Construction Purposes.

.4 CAN/CSA-S269.2-M87 (R2003): Access Scaffolding for Construction Purposes.

.5 CSA S269.3-M92 (R2003): Concrete Formwork.

.6 CGSB 41-GP-35M: Polyvinyl Chloride Waterstop.

2 PRODUCTS

2.1 MATERIALS

.1 Plywood: Douglas Fir species, to CSA O121; Sheathing Grade.

.2 Lumber: SPF species, NLGA Light Framing Grade Category, Utility Grade; with grade stamp clearly visible.

.3 Steel Forms: steel sheet, well matched, tight fitting, and adequately stiffened to support weight of concrete without deflection.

.4 Fibre Glass Reinforced Resin Forms: matched, tight fitting, and adequately stiffened to support weight of concrete without deflection.

.5 Pan Forms: Removable; of sizes and profiles required.

.6 Tubular Column Type Forms: spirally wound, adhesive laminated fibre paper tube forms, coated with hot wax; diameters as required; Handiform or Permaform by Perma Tubes Ltd. or Sonotube by Sonoco Limited.

2.2 ACCESSORIES

.1 Form Ties: removable or snap-off metal type of fixed and adjustable length, with cones and neoprene plugs when used for exposed conditions; to CSA S269.3.

.2 Form Release Agent: colourless mineral oil that will not stain concrete.

.3 Fillets for Chamfered Corners: Rigid formed plastic type; 13 x 13 mm size UNO.

.4 Formed Construction Joints: Premoulded asphaltic board; tongue and groove profile; 6 mm thick; complete with anchorage.

.5 Waterstops: Purpose made polyvinyl chloride, to CGSB 41-GP-35M, Type II; or flexible expanding sodium bentonite based for concrete construction joints.

.6 Dovetail Anchor Slots: Minimum 0.65mm thick galvanized steel; foam-filled; release tape sealed slots; bend tab anchors.

.7 Flashing Reglets: Rigid PVC; longest possible lengths; alignments splines for joints.

.8 Void Forms: Moisture resistant treated paper faces; biodegradable; initial set; 100 mm thick.

.9 Wood Texture Mats: Classic Wood texture mat, 207cm x 55.2cm, product ID FM-8700-S/O by Brickform or approved equal.

3 EXECUTION

3.1 ERECTION

.1 Construct formwork, shoring and bracing in accordance with CSA S269.3 to meet design and code requirements.

.2 Align joints and make watertight. Keep form joints to a minimum.

.3 When using earth forms, hand trim sides and bottoms, and remove loose dirt prior to placing concrete.

.4 Provide bracing to ensure stability of formwork. Shore or strengthen previously constructed formwork liable to be over stressed by construction loads.

.5 Provide chamfer strips on all external corners.

.6 Apply form release agent prior to placing reinforcing steel, anchoring devices, and embedded items. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent.

.7 Provide formed openings where required for pipes, conduits, sleeves, and other work to be embedded in and passing through concrete members.

.8 Place items which will be cast directly into concrete.

.9 Coordinate work of other sections involved in forming and setting openings, slots, chases, sleeves, bolts, anchors, and other inserts.

.10 Install waterstops continuous without displacing reinforcement. Heat seal joints watertight.

.11 Place formed construction joints in pattern pouring sequence. Set top screed to required elevations.

.12 Install void forms in accordance with manufacturer's recommendations.

3.2 FORMWORK CLEANING

.1 Clean forms as erection proceeds, to remove foreign matter.

.2 During cold weather, remove ice and snow from within forms. Do not use calcium chloride or other salt-based de-icing compounds.

3.3 FORM REMOVAL

.1 Do not remove forms, shores and bracing until concrete has gained sufficient strength to carry its own weight, and construction and design load which are liable to be imposed upon it.

.2 Remove formwork progressively and in accordance with code requirements.

.3 Store removed forms, for exposed architectural concrete, in manner that surfaces to be in contact with fresh concrete will not be damaged.

.4 Restore structural support members where required due to design requirements or construction conditions and as required to permit progressive construction.

.5 Remove forms not directly supporting weight of concrete as soon as stripping operations will not damage concrete.

END OF SECTION

1 GENERAL

1.1 INTENT

.1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.2 SECTION INCLUDES

.1 Provide concrete reinforcing required to complete the Work as shown on the Drawings and in accordance with these Specifications including, but not limited to, the following:

.1 Footings under walls.
.2 Concrete slabs on grade.
.3 Miscellaneous concrete items.

.2 The summarized breakdown of the above-mentioned work does not set out all the work under this Section of the Contract, but rather outlines the essentials. Any concrete work indicated on the drawings or hereinafter specified, whether enumerated above or not, shall be carried out under this Section of work.

1.3 WORK EXCLUDED

.1 Contractor shall not be responsible for the following:

.1 Reinforcement in light standard bases.
.2 Reinforcement for electrical duct banks.

1.4 RELATED SECTIONS

.1 Section 32 13 15 – Concrete Forming.

.2 Section 32 13 14 – Cast-in-Place Concrete.

.3 Section 32 13 17 – Concrete Finishing.

1.5 REFERENCES

.1 ACI 544.3R-93: Guide for Specifying, Mixing, Placing and Finishing Steel Fibre Reinforced Concrete.

.2 ASTM A82-05: Standard Specification for Steel Wire, Plain, For Concrete Reinforcement.

.3 ASTM A185/A185M-06: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.4 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction. CSA A23.3-04: Design of Concrete Structures for Buildings.

.5 CSA A23.3-04: Design of Concrete Structures for Buildings.

.6 CSA-G30.18-M92 (R2002): Billet-Steel Bars for Concrete Reinforcement.

.7 CSA W186-M1990 (R2002): Welding of Reinforcing Bars in Reinforced Concrete Construction.

.8 Reinforcing Steel Institute of Canada (RSIC) Manual of Standard Practice.

1.6 SUBMITTALS

.1 Submit Shop Drawings as specified in Division 01300 – Submittals.

.2 Shop Drawings:

.1 Prepared according to RSIC Manual of Standard Practice.
.2 Clearly indicate bar sizes, spacing's, location and quantities of reinforcement, welded wire fabric, chairs spacers and hangers with identifying code marks to permit correct placement without reference to structural drawings.
.3 Provide details to show placement of reinforcing where special conditions occur.
.4 Shop drawings should not contain reproductions of Contract Documents.

.3 Mill Test Reports: a certified copy of mill tests for steel supplied, showing physical and chemical analysis.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Store Products off ground, free from dirt accumulation.

.2 Maintain fabricated shapes.

.3 Store steel fibres in a manner intended to prevent deterioration and intrusion of moisture or foreign matter.

2 PRODUCTS

2.1 MATERIALS

.1 Reinforcing Steel: new billet steel, deformed bars, to CSA-G30.18-M, Grade 400R, unless indicated otherwise; sizes as indicated on Drawings.

.2 Tie Wire: to ASTM A82, minimum 3 mm size, annealed type.

.3 Chairs, Bolsters, Bar Supports, Spacers: adequate for strength and support of reinforcing construction conditions.

2.2 FABRICATION

.1 Fabricate reinforcing steel to CSA A23.1 and RSIC Manual of Standard Practice.

.2 Locate reinforcement splices at point of minimum stress. Fabricate splices with lap lengths as indicated on the Drawings.

.3 Fabricate reinforcing steel within the following tolerances:

.1 Sheared length: plus or minus 25 mm.
.2 Stirrups, ties and spirals: plus or minus 13 mm.
.3 Other bends: plus or minus 25 mm.

.4 Ship bundles of bar reinforcement clearly identified in accordance with bar lists.

.5 Substitutes of different size bars will be permitted only upon written approval of the Consultant.

3 EXECUTION

3.1 PREPARATION

.1 Clean reinforcing of any loose scale, oil, dirt or other coatings which would destroy or reduce the bond.

3.2 INSTALLATION

.1 Place reinforcing to CSA A23.3 and the RSIC Manual of Standard Practice.

.2 Place reinforcing accurately and secured in place by the use of chairs, spacers and hangers. Special care shall be taken to see that the bars in the top of the concrete members are supported in such a manner that they will not be displaced during the pouring of the concrete.

.3 Obtain Consultant's approval before welding reinforcing bars. Weld reinforcing to CSA W186-M.

.4 Bars shall be held and securely tied together using tie wire.

.5 Any bars which are displaced during the pouring of the concrete shall be immediately re-set.

.6 Where the under-surface of concrete is to remain exposed, non-staining chairs shall be used as approved by the Project Manager.

.7 The reinforcement shall be protected by the thickness of concrete indicated on the Drawings. Where not otherwise shown, the thickness of concrete over the reinforcement shall be as follows:

.1 Where concrete is exposed to the ground without the use of forms - 75 mm.
.2 Where concrete is exposed to the weather or to the ground but placed in forms - 50 mm for bars larger than 15M and 40 mm for 15M bars or smaller.
.3 In slabs and walls not exposed to the ground or to the weather 40 mm for bars larger than 35M and 25 mm for 35M or smaller.
.4 In beams, girders and columns not exposed to the ground or to the weather 40 mm.
.5 In all cases, at least equal to the diameter of the bars.

.8 Exposed reinforcing bars intended for bonding with future extensions shall be protected from corrosion by lean concrete or other adequate covering.

END OF SECTION

1 GENERAL

1.1 INTENT

.1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.2 SECTION INCLUDES

.1 Finishing of horizontal concrete surfaces, including cast in place concrete benches.

1.3 RELATED SECTIONS

.1 Section 32 13 13 – Concrete Paving.

.2 Section 32 13 14 – Cast-in-Place Concrete.

.3 Section 32 13 15 – Concrete Forming.

.4 Section 32 13 16 – Concrete Reinforcement.

1.4 REFERENCES

.1 ASTM C309-06: Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.2 CSA A23.1-04: Concrete Materials and Methods of Concrete Construction. CSA A23.2-04: Methods of Test and Standard Practices for Concrete.

.3 CSA A23.2-04: Methods of Test and Standard Practices for Concrete.

1.5 QUALITY ASSURANCE

.1 Applicator: person or firm specializing in commercial concrete floor finishing, and with five years documented experience.

1.6 PROJECT CONDITIONS

.1 Perform Work only when environmental conditions are suitable do so so.

.2 Ensure that adequate temporary heating is provided as required for cold weather work.

2 PRODUCTS

2.1 MATERIALS

.1 Hardener: non-metallic type, Diamag 7 by Sika Canada Inc., Sealtight Type R-Premixed by W. R. Meadows, or Maximent by Degussa.

.2 Water: as specified in Section 03 30 00.

3 EXECUTION

3.1 EXAMINATION

.1 Verify existing conditions are ready to receive work.

.2 Verify concrete does not contain admixtures which would be incompatible with floor hardener materials or other applied finishes.

.3 Beginning of application implies acceptance of existing site conditions.

3.2 FINISHING

.1 Floating

.1 After the concrete has been properly placed, struck off, and darbied or bullfloated, it shall not be worked until ready for floating. The lapse of time between darbying and power floating may vary from 2 to 8 hours or more depending on the weather conditions, concrete temperature, and the concrete mixture. Floating shall begin when the water sheen has disappeared and/or the mix has stiffened sufficiently that the weight of a man standing on it leaves only a slight imprint on the surface. If two power floating operations are necessary to bring the surface to the desired state, the concrete shall be allowed to stiffen or become harder before beginning the second floating operation.

.2 Trowelling

.1 Both power and hand trowelling shall be required. Power trowelling shall begin as soon as little or no cement paste clings to the blades. Trowelling shall be continued until the surface is dense, smooth, and free of all minor blemishes, such as trowel marks.

.2 Final hand trowelling shall be required to remove slight imperfections left by trowelling machines and to bring the surface to a dense, smooth polished finish. Final hand trowelling shall be continued until a ringing sound is heard as the trowel passes over the surfaces.

.3 Sprinkling of dry cement or a mixture of dry cement and sand on the surface of the fresh concrete to absorb water or to stiffen the mix shall not be permitted during any stage of floor construction.

.3 Floor Finish

.1 Exterior slabs shall receive a float finish plus a coarse brooming to give a good non-slip surface.

.2 Exposed concrete stairs shall receive a light broom finish to the project manager's approval.

.4 Exterior finishes

.1 Broom Finish

.1 After float and or Trowel finishing, surfaces to be broom-finished shall be slightly roughed by light brooming with a stiff brush or broom to a uniform non-skid surface to the satisfaction of the Consultant. Textured Broom Finish, when indicated, will have a random swirl, stiff brush finish. Finished surfaces, unless otherwise indicated, shall be true in all planes within 8 mm in 3m as determined by a 3 m straightedge placed anywhere in the concrete.

3.3 CURING

.1 Cure concrete to CSA A23.1/A23.2.

.2 Curing of exposed surfaces shall commence as soon as the concrete has hardened sufficiently to prevent surface damage. Curing of concrete surfaces shall be achieved using one or more of the following methods:

.1 ponding or continuous sprinkling;
.2 absorptive mat or fabric kept continuously wet;
.3 4 mil thick polyethylene plastic film;
.4 other moisture-retaining methods as approved by the Consultant.

.3 Basic Curing: moist cure concrete for a period of either three days at a minimum temperature of 10 degrees C or for the time necessary to attain 35% of the specified 28-day compressive strength of the concrete.

.4 Cure air-entrained concrete an additional four consecutive days (for a total of seven days) at a minimum temperature of 10 degrees C or for the time necessary to attain 70% of the specified 28-day compressive strength of the concrete.

.5 The basic curing time shall be extended on all structural concrete until the concrete has achieved sufficient strength for structural safety. (70% of the specified 28-day compressive strength of the concrete unless otherwise directed by the Consultant.)

.6 When the air temperature is above 27 degrees C, perform curing to CSA A23.1.

.7 During freezing weather, terminate water curing of concrete 12 hours before the end of the protection period.

.8 Moisture cure fibre-reinforced slabs for a minimum of 7 days.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 32 91 19.16 – Topsoil Placement for Vegetated Roofs

.2 Section 32 92 20 - Seeding

.3 Section 32 92 23 - Sodding

.4 Section 32 93 10 - Trees, Shrubs and Ground Cover Planting

1.2 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil amendment.

.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 30), and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category A.

1.3 REFERENCE STANDARDS

.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

.3 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA):

.1 Canadian Landscape Standard, 2024

.2 Canadian Nursery Stock Standard, 2017

1.4 SUPPLIED MATERIALS

.1 Contractor will supply topsoil delivered to job site.

1.5 MEASUREMENT PROCEDURES

.1 Measure supplying, placing and spreading topsoil in cubic metres as determined from actual surface area covered and depth of topsoil specified.

.1 Specified depth of topsoil: Measured and approved by Consultant after settlement and consolidation as specified.

1.6 PAYMENT

.1 Testing of topsoil: Contractor will pay for cost of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Quality control submittals:

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.8 QUALITY ASSURANCE

.1 Pre-installation meetings: Conduct pre-installation meeting to verify Project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method (CPM) or Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.

.2 Qualifications: Submit proof of qualifications when requested by Consultant.

.3 Contractor Qualifications:

.1 Landscape Contractor: To be a Member in Good Standing of Landscape Ontario Green for Life (LO).

.2 Landscape Supervisor: Landscape Horticulturist Journeyperson or Landscape Industry Certified Technician with Softscape Installation designation or equivalent.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused soil amendments from landfill to official hazardous material collections site approved by Consultant.

.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 Soil for seeded and sodded areas: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 Soil texture based on The Canadian System of Soil Classification, to consist of 40 to 50 % sand, 13 to 30 % silt, 3 to 15 % clay, and 3 to 10 % organic matter by dry weight.

.2 pH between 6.0 and 8.0.

.3 Contain no toxic elements or growth inhibiting materials.

.4 Finished surface free from:

.1 Debris and stones over 50 mm diameter.

.2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.5 Drainage: Percolation shall be such that no standing water is visible 60 minutes after at least 10 minutes of moderate to heavy rain or irrigation.

.6 Consistency: Friable when moist.

2.2 PLANTING SOIL

.1 Soil for planting beds: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 Soil texture

.1 For ground level planting beds: based on The Canadian System of Soil Classification, to consist of 40 to 50 % sand, 15 to 50 % silt, 15 to 30 % clay, and contain 4 to 15 % organic matter by dry weight.

.2 pH between 6.0 and 8.0.

.3 Contain no toxic elements or growth inhibiting materials.

.4 Finished surface free from:

.1 Debris and stones over 50 mm diameter.

.2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.5 Drainage: Percolation shall be such that no standing water is visible 60 minutes after at least 10 minutes of moderate to heavy rain or irrigation.

.6 Consistency: Friable when moist.

2.3 SOIL AMENDMENTS

.1 Fertilizer:

.1 All Fertilizers shall be a standard commercial brand, having a guaranteed N-P-K analysis meeting the requirements of the Canada Fertilizer Act and the CFQAP.

.2 Types: All Fertilizers shall be granular, pelletized or pill form, and shall be dry and free flowing, unless otherwise specified.

.3 Fertility: Major and micro soil nutrients shall be as recommended by the laboratory soil specialist, based on the test results of the growing medium and within the following range:

.1 Topsoil

.1 Nitrogen (N): 0.2 to 0.6 % by weight.

.2 Phosphorus (P): 80 to 250 parts per million.

.3 Potassium (K): 130 to 500 parts per million.

.4 Magnesium (Mg): < 40:1

.5 Calcium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.

.2 Planting Soil

.1 Nitrogen (N): 0.2 to 0.6 % by weight.

.2 Phosphorus (P): 10 to 60 parts per million.

.3 Potassium (K): 80 to 250 parts per million.

.4 Magnesium (Mg): 100-300 parts per million.

.5 Calcium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.

.4 Application Rate: as recommended by the laboratory soil specialist, based on the test results of the growing medium and as approved by the Consultant.

.2 Peatmoss: Sphagnum peat moss is not an acceptable material.

.3 Sand: washed coarse silica sand, medium to coarse 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.

.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 Use industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.4 SOURCE QUALITY CONTROL

.1 Advise Consultant of sources of topsoil and planting soil to be used with sufficient lead time for testing.

.2 Contractor is responsible for amendments to imported soil(s) as specified.

.3 Conduct soil testing by recognized testing facility for pH, Nitrogen (N), Phosphorous (P), and Potassium (K), and organic matter.

.4 Carry out testing of topsoil by testing laboratory designated by Consultant.

.1 Perform soil sampling, testing and analysis in accordance with applicable Provincial standards.

Part 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated by Consultant after area has been cleared of stumps, rocks 100 mm and over, invasive and noxious plants and their reproductive parts, brush, weeds, and grasses and removed from site.

.2 Strip topsoil to depths as indicated by Consultant.

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Consultant.

.1 Stockpile height not to exceed 2m.

.2 Protect stockpile from adverse weather conditions, contamination from invasive plant material, and compaction.

.3 Avoid placing stockpile in low areas where natural drainage or storm water could pond, or erode these materials during inclement weather.

.4 Dispose of unused topsoil in an environmentally responsible manner but not used as landfill as directed by Consultant.

3.2 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify Consultant and do not start work until instructed by Consultant.

.2 Grade soil, eliminate uneven areas and low spots, ensure positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 75 mm above surface.

.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 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 Consultant has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 Keep topsoil 15 mm below finished grade for sodded areas.

.4 Spread soil as indicated on the Drawings, or to the following minimum depths after settlement.

.1 200 mm for high-traffic seeded and sodded areas.

.2 300 mm for low-traffic seeded areas.

.3 450 mm for shrub beds.

.4 600 mm for tree beds.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

.6 Avoid spreading or grading in wet, frozen, or saturated state.

3.4 SOIL AMENDMENTS

.1 Apply and thoroughly mix soil amendments as recommended from soil testing report into full specified depth of topsoil and planting soil. Ensure unused amendments are diverted from the landfill and do not enter the water supply.

.2 Fertilizer shall be packed in standard waterproof containers, clearly marked with the name of the manufacturer, weight and analysis.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Consultant.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

.1 Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

.1 Dispose of surplus materials off-site.

3.8 CLEANING

.1 Work area cleaning expectations include;

.1 Leave Work area organized and tidy 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 Upon completion remove surplus materials, rubbish, tools and equipment.

.1 Clean and reinstate areas affected by Work.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 32 91 19.13 – Topsoil Placement and Grading

1.2 Submittals

.1 The Consultant will be provided with a representative seed mix of the plant species and percentages, and seeding rates. Accepted seed mixes become the standard of acceptance for the work.

1.3 Scheduling

.1 March 1 through June 29: Seeding during this period is appropriate but germination of a portion of the seed may not occur until the following season due to lack of cold stratification to break seed dormancy. Cover crop generally germinates within 2 to 3 weeks of seeding operation.

.2 June 20 through August 30: Installation of native seed should be suspended unless supplemental watering can be provided, or unseasonably cool conditions persist.

.3 October 1 through November 30: Seed on bare, graded surfaces must be protected with specified erosion control blankets on slopes. Seed drilled into existing vegetation or on flat ground not subject to erosion may need only minimal erosion protection. Less cover crop will be observed during the following spring due to frost damage.

1.4 Delivery And Storage

.1 Deliver seed mixes in original containers showing:

.1 Analysis of seed mixture.

.2 Percentage of pure seed.

.3 Year of production.

.4 Net weight.

.5 Date when tagged and location.

1.5 Acceptance

.1 Seeded areas will be accepted by the Consultant at the end of the maintenance period provided that:

.1 Seeded areas are properly established.

.2 Seeded areas are free of bare and dead spots and weed growth per the Performance Standards of this Section.

.3 Plants are healthy, dense, well-rooted, of good colour and in a vigorous growing condition.

.2 Areas seeded in the fall will be accepted in the following spring, one month after the start of the growing season provided that the conditions of section 1.2.1 are fulfilled.

1.6 Performance Standards

.1 At least 90% of the seeded area shall be vegetated with cover crop species from the seed mix by July 30 following a spring seeding. If planting occurred in the fall or winter minimum cover crop is expected. Matting shall be reviewed in the spring to ensure that proper erosion control and seed protection is in place.

.2 After one (1) full growing season coverage of non-cover crop species shall be at minimum 40%. There shall be no more than 0.25 square-meter of area devoid of vegetation, as measured by aerial visual review.

.3 After two (2) full growing seasons, coverage of non-cover crop species shall be at minimum 75%. There shall be no more than 0.25 square-meter of area devoid of vegetation, as measured by aerial visual review.

.4 At any time during the contract period no more that 10% (by aerial review) of seeded areas should be dominated by aggressive exotic species which include, but are not limited to, Reed Canary Grass (Phalaris arundinacea), Crab Grass (Digitaria spp.), Red Clover (Trifolium spp.), White or Yellow Sweet Clover (Melilotus spp.), Burdock (Arctium minus), Teasel (Dipsacus sylvestris), Canada Thistle (Cirsium arvense).

.5 If these standards are not met, the Contractor shall be responsible for repair and supplemental seeding in accordance with the specifications.

PART 2 - PRODUCTS

2.1 Materials

.1 Seed

.1 Comply with Federal and Provincial seed laws having a minimum germination of 75% and minimum purity of 97%.

.2 In packages individually labelled in accordance with ‘Seeds Regulations’ and indicating name of supplier, seed mix content, germination rate, and date bagged.

.3 Seed to be cleaned and free from stems, chaff, fluff, bracts, leaves and weed seeds.

.4 Species known to be invasive or potentially invasive by the Province of Ontario and Lake Simcoe Region Conservation Authority shall not be used.

.2 Seed Mixture 'A' – Upland Mix

.1 Available from OSC Seed or approved alternate.

.2 Seed at 25kg/Ha + nurse crop:

Percent	Latin Name	Common Name
1%	Anemone canadensis	Canada Anemone
2%	Asclepias syriaca	Common Milkweed

15%	Carex granularis	Limestone Meadow Sedge
40%	Elymus virginicus	Virginia Wildrye
1%	Euthamia graminifolia	Grass-leaved Goldenrod
1%	Monarda fistulosa	Wild Bergamot
25%	Oenothera biennis	Common Evening Primrose
10%	Rudbeckia hirta	Black Eyed Susan
1%	Solidago canadensis	Canada Goldenrod
1%	Solidago juncea	Early Goldenrod
1%	Solidago nemoralis	Gray-stemmed Goldenrod
1%	Symphyotrichum novae-angliae	New England Aster
1%	Verbena urticifolia	White Vervain

.3 Seed Mixture 'B' – Lowland Mix

.1 Available from OSC Seed or approved alternate.

.2 Seed at 180kg/Ha + nurse crop:

Percent	Latin Name	Common Name
25%	Carex vulpinoidea	Fox Sedge
35%	Elymus virginicus var. virginicus	Virginia Wildrye
5%	Juncus tenuis	Path Rush
25%	Poa palustris	Fowl Bluegrass
5%	Scirpus atrovirens	Dark-green Bulrush
5%	Verbena urticifolia	White Vervain

.4 Nurse Crop:

.1 Submit nursery recommended species suitable for each Seed Mix and planting season. Refer to Schedule for seeding windows.

.5 Water: Potable, on site.

.6 Hydraulic Mulch: Type A, as per OPSS 572.

.7 Dry Mulch: Chopped Straw Mulch, as per OPSS 572.

.8 Erosion Control Blanket: Terrafix S100B Straw Single Net, or approved equivalent.

.9 Seed Drill for seed beds: Tye drill, Truax drill, or John Deere Rangeland drill.

PART 3 - EXECUTION

3.1 Workmanship

.1 Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.

.2 Keep site well drained. Keep excavations dry.

.3 Clean up immediately any soil or debris spilled onto pavement. Dispose of deleterious material off site.

3.2 Preparation Of Surfaces

.1 Verify finished grades are correct and have been accepted by Consulting Engineer per approved grading plans.

.2 Scarify soil surface to a depth of 25mm minimum of area to be seeded.

.3 Seed bed surface must be free of all deleterious material and finished grade must be free of humps and hallows. Surface must be chain-harrowed to provide a fine, clump-free seed bed just prior to seeding.

.4 Seed beds must receive an organic, pre-emergent herbicide application of Turf Maize, 98% Corn Gluten Meal, pre-emergent weed control per manufacturer's recommendations and at least 2 weeks prior to the final cultivation before seeding.

3.3 Extent Of Seeding

.1 Areas to be seeded are shown on the drawings or disturbed by construction other than areas to be sodded, paved or installed as planting beds.

3.4 Seeding

.1 Seeding must occur when soil moisture is appropriate for seeding operation.

.2 Seed shall not receive fertilizer.

.3 Wet seed that is moldy or otherwise damaged in transit or storage shall not be used.

.4 All drill seeding equipment shall be calibrated to deliver the seed at the rates and proportions specified in subsection 2.0. Equipment shall be operated in such a manner as to ensure complete coverage of the entire area to be seeded, and seed must be placed no deeper than 6 mm into prepared seedbed.

.5 Sow one half of the required amount of seed in one direction and follow by sowing the other half at right angles to it. The last pass shall be at right angles to the slope.

.6 In the case of late fall seeding, sufficiently protect all seeded areas from damage by erosion, pedestrians and vehicles.

.7 After seeding operation is completed, supply and install an erosion control blanket per manufacturers specifications on all slopes exceeding 3:1.

3.5 Erosion Control

.1 Install according to manufacturer's specifications.

3.6 Maintenance During Establishment Period

.1 Maintain seeded areas from the time of installation until acceptance.

.2 Water seeded area to maintain optimum soil moisture level for germination and continued healthy growth of plants. Control watering to avoid washouts.

.3 Repair and reseed dead or bare spots to allow establishment of seed.

.4 Check the site for broken branches, leaves, paper and similar material to keep the area reasonably clean at all times. Remove all extraneous material from the site. No material shall be burned on the site. Paved areas and lawns shall be kept clean at all times.

.5 Maintain all seeded areas weed-free.

3.7 Warranty

.1 Seeded areas shall be warrantied for one (1) year after preliminary acceptance.

.2 Only seed which is rooted in place and exhibiting vigorous healthy growth at the time of inspection will be deemed to have met the terms of the Warranty.

.3 Seeded areas which show deterioration, bare spots, or failure to take root and thrive, shall be re-seeded and maintained for an additional sixty (60) days according to all the requirements as described in this section.

.4 Rills and gullies greater than 100mm in width shall be repaired immediately throughout the warranty period.

END OF SECTION

PART 1 - GENERAL

1.1 Work Included

1. Supply and laying of sod.
2. Fertilizing.
3. Maintenance and clean-up of site.

1.2 Related Sections

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

1.3 Scheduling

1. Schedule sod laying to coincide with preparation of soil surface.
2. Schedule sod installation after planting.
3. Coordinate sod laying with work of other trades.

1.4 Source Quality

1. Obtain approval from landscape consultant of source of sod.
2. When proposed source of sod is approved, use no other source without written authorization.

PART 2 - PRODUCTS

2.1 Materials

1. Number One Turfgrass Nursery Sod: Sod that has been especially sown and cultivated in nursery fields as turfgrass crop and is harvested with a mechanical sod cutter to a thickness of not less than 25 mm and not more than 40 mm and is supplied in rolls of approximately 0.9 sq m in surface area. Quality and source to comply with standards outlined in Canadian Standards for Nursery Stock, 7th Edition, published by the Canadian Nursery Landscape Association.
    1. Number One Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Fescue, containing not less than 90% Fescue cultivars and 10% perennial ryegrass cultivar(s).
2. Sod establishment support: wooden pegs: 17 x 8 x 250 mm.
3. Water: potable, supplied on site.
4. Fertilizer:
    1. To Canada ‘Fertilizers Act’ and ‘Fertilizers Regulations’.
    2. Complete synthetic, slow release with minimum 50% of nitrogen content in ureaformaldehyde form.
    3. Fertilizer Composition Ratio: 6-12-12.

PART 3 - EXECUTION

3.1 Preparation

1. Verify that grades are correct and prepared in accordance with Section 32 91 19 – Topsoil and Fine Grading. If discrepancies occur, notify Consultant and do not commence work until instructed.
2. Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.
3. Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, surface to drain naturally.
4. Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; and other deleterious materials; off site.
5. Cultivate approved fine grade to 25 mm depth immediately prior to sodding.

3.2 Sod Placement

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

3.3 Sod Placement on Slopes

1. Start laying sod at bottom of slopes.
2. Lay sod sections longitudinally, along contours of slopes steeper than 3 horizontal to 1 vertical, and where indicated.
3. Peg sod on slopes to following pattern:
    1. 100 mm below top edge, using 3 stakes evenly spaced per roll, for first sod sections along contours of slopes.
    2. Stake alternate rows.
    3. Drive pegs flush, but not below surface of sod sections.

3.4 Application Of Fertilizer

1. Fertilize at time of installation at a rate of 18 lbs. per 1000 sq.ft. of sodded area.
2. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
3. One additional fertilizer application will be required. Timing will be dependent on weather and turf conditions but should occur once sod is established.
4. Additional fertilizer applications may be required to properly establish turf. This is to be determined by Consultant.

3.5 Maintenance

1. Perform following operations from time of installation until acceptance:
    1. Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
    2. Cut grass to 65 mm when it reaches a height of 90 mm. Remove clippings that will smother grassed areas. A minimum of two mowings are required.
    3. Maintain sodded areas weed free.
    4. Check the site for broken branches, leaves, paper and similar material to keep the area reasonably clean at all times. Remove all extraneous material from the site. No material shall be burned on the site. Paved areas and lawns shall be kept clean at all times.
    5. Damage resulting from erosion, washout, or any other cause shall be repaired immediately by the Contractor at no additional cost to the Owner.
    6. Grass areas which show deterioration or bare spots shall be re-sodded within the maintenance period so that at no time does the grass show signs of wear.
    7. Fertilize per 3.4 above.

3.6 Acceptance

1. Turfgrass Nursery Sod areas will be accepted provided that:
    1. Sodded areas are properly established.
    2. Sod is free of weeds, bare and dead spots.
    3. No surface soil is visible when grass has been cut to height of 40 mm.
    4. Sodded areas have been cut within 24 h prior to acceptance.
    5. Sodded areas have been fertilized.
2. Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.7 Warranty

1. The contractor hereby guarantees that sod will remain free of defects for one (1) years following preliminary acceptance. Refer to Architectural Division One and Supplemental General Conditions for Warranty.
2. Only sod which is rooted in place and exhibiting vigorous healthy growth at the time of inspection will be deemed to have met the terms of the Warranty.
3. Sod areas which show deterioration, bare spots, or failure to take root and thrive, shall be re-sodded and maintained for an additional 90 days according to all the requirements as described in this section.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 32 91 19.13 - Topsoil Placement and Grading

.2 Section 32 93 40 – Planting Maintenance

1.2 DEFINITIONS

.1 Mycorrhiza: Association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.3 REFERENCE STANDARDS

.1 National Resources Canada (NRCan):

.1 Canada's Plant Hardiness Zones, 2022

.2 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA):

.1 Canadian Landscape Standard, 2024

.2 Canadian Nursery Stock Standard 2017, Ninth Edition

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS)

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling: obtain approval from Consultant of schedule seven (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.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for planting soil, trees, shrubs, ground cover, fertilizer, mycorrhiza,

anti-desiccant, anchoring equipment, and mulch and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS SDS

.3 Samples:

.1 Submit samples of mycorrhiza, mulch and coir discs.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant.

.1 Landscape Contractor: to be a Member in Good Standing of International Society of Arboriculture, Canadian Nursery Landscape Association, Landscape Ontario Green for Life (LO).

.2 Landscape Supervisor: Landscape Horticulturist Journeyperson or Landscape Industry Certified Technician with Softscape Installation designation or equivalent.

.3 Landscape Maintenance Supervisor: Landscape Horticulturist Journeyperson or Landscape Industry Certified Technician with Ornamental Maintenance designation or equivalent.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.1 Protect plant material from frost, excessive heat, wind and sun during delivery.

.2 Protect plant material from damage during transportation:

.1 Delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.

.2 Delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.

.3 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.

.3 Storage and Handling Requirements:

.1 Immediately store and protect plant material which will not be installed within three (3) hours.

.1 Store in accordance with supplier's written recommendations at a storage location approved by Consultant.

.2 Protect stored plant material from frost, wind and sun to ensure planting success as follows:

.1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil or mulch and watering to full depth of root zone.

.2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.

.3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.

.3 Store and manage hazardous materials in accordance with manufacturer's written instructions.

.4 Packaging Waste Management: Remove for reuse and return pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.8 WARRANTY

.1 Contractor hereby warrants that plant material as itemized on plant list will remain free of defects for (1) one year from time of acceptance, providing adequate maintenance has been provided.

.2 End-of-warranty inspection will be conducted by Consultant.

.3 Consultant reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

Part 2 PRODUCTS

2.1 PLANT MATERIAL

.1 Type of root preparation, sizing, grading and quality: comply to Canadian Nursery Stock Standard.

.1 Source of plant material: grown in Zone 5a-6a in accordance with Plant Hardiness Zones in Canada.

.2 Plant material shall be planted in zone specified as appropriate for its species.

.3 Plant material in location appropriate for its species.

.2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

.3 Trees: with straight trunks, well and characteristically branched for species.

.4 Trees larger than 200 mm in caliper: half root pruned during each of two successive growing seasons, the latter at least one growing season before arrival on site.

.5 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.

.6 Collected stock: maximum 40 mm in caliper, with well developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.

.1 During collection, ensure 10% maximum seed crop (or plants) are collected from healthy population of many individuals, and from several plants of same species.

.2 Leave remainder for natural dispersal and as food for dependent organisms.

2.2 WATER

.1 Free of impurities that would inhibit plant growth.

2.3 STAKES

.1 Round untreated heartwood, pointed one end, 38 x 38 x 2300 mm.

2.4 TRUNK TIE

.1 Fully woven biodegradable fibre

2.5 ANCHORS

.1 Drive-in Deadman or Plate

.1 Type 1: 13 mm diameter x 75 mm long, aluminum.

.2 Type 2: 18 mm diameter x 120 mm long, aluminum.

2.6 TRUNK PROTECTION

.1 Plastic: perforated spiralled strip.

.2 Burlap: clean 2.5 kg/m ^{2} minimum mass and 150 mm minimum wide, and twine fastener.

2.7 MULCH

.1 Bark chip: varying in size from 25 to 50 mm in diameter, from bark of coniferous trees.

.2 Shredded wood: varying in size from 25 to 125 mm in length, from coniferous trees.

2.8 FERTILIZER

.1 Synthetic commercial type as recommended by soil test report.

.1 Endomycorrhizae and ectomycorrhizae inoculant with a variety of fungi species suitable for deciduous trees, coniferous trees, shrubs and herbaceous plants.

.2 Ensure new root growth is in contact with mycorrhiza.

.3 Use mycorrhiza as recommended by manufacturer’s written recommendations.

.4 Recommended manufacturers:

.1 Root Rescue, (416) 995 9050. www.rootrescue.com.
.2 Premier Tech Ltd, (800) 606 6926. www.usemyke.com.

2.9 ANTI-DESICCANT

.1 Wax-like emulsion.

2.10 FLAGGING TAPE

.1 Fluorescent, green colour.

2.11 SOURCE QUALITY CONTROL

.1 Obtain approval from Consultant of plant material before planting.

.2 Imported plant material shall be accompanied with necessary permits and import licenses. Conform to Federal and Provincial regulations.

Part 3 EXECUTION

3.1 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 Consultant.
.2 Inform Consultant 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 Consultant.

3.2 PRE-PLANTING PREPARATION

.1 Proceed only after receipt of written acceptability of plant material from Consultant.

.2 Remove damaged roots and branches from plant material.

.3 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.

.4 Locate and protect utility lines.

.5 Notify and acquire written acknowledgement from utility authorities before beginning excavation of planting pits for trees and shrubs.

3.3 EXCAVATION AND PREPARATION OF PLANTING BEDS

.1 Establishment of sub-grade for planting beds in accordance with Section 31 22 13 - Rough Grading.

.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 Consultant before excavating.

.2 Excavate to depth and width as indicated on Drawings or directed by Consultant.

.3 Execute excavation work in accordance with Section 31 23 33.01 - Excavation Trenching and Backfilling.

.4 Remove subsoil, 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.

.5 Scarify sides of planting hole.

.6 Remove water which enters excavations before planting. Notify Consultant if water source is ground water.

3.4 PLANTING

.1 For bare root stock, place 50 mm backfill soil in bottom of hole.

.1 Plant trees and shrubs with roots placed straight out and spread evenly in hole.

.2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball.

.1 Do not pull burlap or rope from under root ball.

.3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.

.4 Plant vertically in locations as indicated on Drawings or directed by Consultant.

.1 Orient plant material to give best appearance in relation to structure, roads and walks.

.5 For trees and shrubs:

.1 Backfill soil in 150 mm lifts.

.1 Tamp each lift to eliminate air pockets.

.2 When two thirds of depth of planting pit has been backfilled, fill remaining space with water.

.3 After water has penetrated into soil, backfill to finish grade.

.2 Form watering saucer as indicated on Drawings or directed by Consultant.

.6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

.7 Perform backfilling work in accordance with Section 31 23 33.01 - Excavation Trenching and Backfilling.

.8 Water plant material thoroughly.

.9 After soil settlement has occurred, fill with soil to finish grade.

3.5 TRUNK PROTECTION

.1 Install trunk protection on deciduous trees as indicated on Drawings or directed by Consultant.

.2 Install trunk protection before installation of tree supports.

3.6 TREE SUPPORTS

.1 Install tree supports as indicated on Drawings or directed by Consultant.

.2 Use single stake tree support for deciduous trees less than 3 m in height and evergreens less than 2 m in height.

- .1 Place stake on prevailing wind side and 150 mm minimum from trunk.
- .2 Drive stake 150 mm minimum into undisturbed soil beneath roots.
  - .1 Ensure stake is secure, vertical and unsplit.
- .3 Install 150 mm long guying wire 1500 mm above grade.
- .4 Thread Type 1 guying wire through guying collar tube.
  - .1 Twist wire to form collar and secure firmly to stake. Cut off excess wire.

.3 Use three (3) guy wires and anchors for deciduous trees greater than three (3) m in height, 12 cm caliper and evergreens greater than two (2) m in height.

- .1 Use Type 2 guying wire with clamps for trees less than 75 mm in diameter and Type 3 guying wire with clamps for trees greater than 75 mm in diameter.
- .2 Use Type 1 anchors for trees less than 75 mm in diameter and Type 2 anchors for trees greater than 75 mm in diameter.
- .3 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.
- .4 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
- .5 Install anchors at equal intervals about tree and away from trunk so guy wire will form 45-degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.
- .6 Attach guy wire to anchors. Tension wire and secure by multi-wraps or installing clamps.
- .7 Install wire tightener ensuring that guys are secure and leave room for slight movement of tree but do not allow for root system to shift into growing medium.

.8 Saw tops off wooden anchors which extend in excess of 100 mm above grade or as directed by Consultant.

.9 Install flagging tape to guys as indicated on Drawings or directed by Consultant.

.4 After tree supports have been installed, remove broken branches with clean, sharp tools.

3.7 MULCHING

.1 Ensure soil settlement has been corrected before mulching.

.2 Spread mulch as indicated on Drawings or directed by Consultant.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following maintenance operations from time of planting to acceptance by Consultant.

.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.

.1 Monitor and maintain self watering product during establishment period.

.2 Water evergreen plant material thoroughly in late fall before freeze-up to saturate soil around root system.

.2 Remove weeds monthly.

.3 Replace or re-spread damaged, missing or disturbed mulch.

.4 Cultivate non-mulched areas, as required to keep top layer of soil friable.

.5 Use appropriate control methods if required, to control insects, fungus and disease, in accordance with federal, provincial and municipal regulations. Obtain product approval from Consultant before application.

.6 Remove dead or broken branches from plant material.

.7 Keep trunk protection and guy wires in proper repair and adjustment.

.8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.9 MAINTENANCE DURING WARRANTY PERIOD

.1 From time of acceptance by Consultant to end of warranty period, perform following maintenance operations.

.1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

.1 Self watering product to be monitored and maintained during warranty period.

.2 Reform damaged watering saucers.

.2 Remove weeds monthly.

.3 Replace or re-spread damaged, missing or disturbed mulch.

.4 Cultivate non-mulched areas, cultivate monthly to keep top layer of soil friable.

.5 Use appropriate control methods, if f required to control insects, fungus and disease, in accordance with federal, provincial and municipal regulations. Obtain product approval from Consultant before application.

.6 Apply fertilizer in early spring as indicated by soil test.

.7 Remove dead, broken or hazardous branches from plant material.

.8 Keep trunk protection and tree supports in proper repair and adjustment.

.9 Remove trunk protection, tree supports and level watering saucers at end of warranty period.

.10 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.10 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.

.2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

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

.1 Divert discarded burlap, wire and plastic plant containers materials from landfill to plastic recycling facility.

.2 Dispose of unused fertilizer at official hazardous material collection site.

.3 Dispose of unused anti-desiccant at official hazardous material collections site.

.4 Divert unused wood and mulch materials from landfill to composting facility.

3.11 CLOSEOUT ACTIVITIES

.1 Submit trees, shrubs and other plantings maintenance reports for review by Consultant.

END OF SECTION

1 GENERAL

1.1 SCOPE OF WORK

.1 Provide all equipment, material and labour for the maintenance of trees, shrubs, and perennials to fulfil the requirements for the plant material warranty.

.2 Work includes supply and install of plant replacements, weeding, watering, organic pest and disease control, growth control, organic fertilizing, cultivation, pruning, plant protection and mulching. This shall include all planted materials and replacement plant materials.

.3 Prepare a maintenance schedule.

.4 Prepare and submit monthly Maintenance Reports.

1.2 WORKMANSHIP

.1 All work shall at least conform to the rules and custom of best trade practices; to be executed by skilled tradesmen well equipped and adequately supervised and performed in accordance with these guidelines.

1.3 SUPERVISION

.1 Supervisors shall have practical experience and knowledge of plant material, organic pest and disease control.

1.4 RELATED SECTIONS

.1 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

1.5 REFERENCES

.1 ANSI Z-133-1; American Standards for Tree Care Operations.

.2 ANSI A-300; International Society of Arboriculture Best Management Practices - Tree Pruning Guidelines.

.3 Landscape Ontario Horticultural Trades Association, Landscape Standards.

1.6 DURATION

.1 Landscape maintenance shall commence upon date of substantial completion and continue for two (2) full years following that date. Contractor is responsible for completion of all warranty deficiencies beyond the warranty end date if needed.

1.7 NOTIFICATION

.1 Notify the Consultant/Owner before undertaking pruning, and if any disease or insect problems arise.

2 MAINTENANCE OF PLANTED AREAS

2.1 WARRANTY MAINTENANCE

.1 Provide all necessary maintenance to ensure the establishment and vigor of the plant material. This includes additional watering, watering at freeze up, installing additional mulch to meet specified depths, maintaining all stakes, guys and rodent protection, and any other measures necessary to achieve the required plant health.

.2 Remove all stakes, guards, guy wires, etc., remaining on plant material at end of warranty period, (the Consultant to inform the Contractor in writing if conditions warrant an extension on staking). If stakes are deemed necessary beyond the 2-year warranty period the Contractor will not be responsible for their removal.

.3 Rodent guards are to remain in place at the end of the warranty period

.4 Restore the site to original conditions from damage arising out of all replacement operations at no cost to the Owner.

2.2 PLANT REPLACEMENTS

.1 All plants that are dead, or not in a healthy, satisfactory growing condition, or which in any way do not meet the requirements of the specifications, shall be replaced by

the Contractor at the Contractor's expense. All required replacements shall be as originally specified. Where plant material is replaced, the warranty period for the replacement shall be for two (2) years following the acceptance date of the replacement plant material. The Consultant or Owner reserves the right to extend Contractor's warranty responsibilities for an additional year if, at end of initial warranty period, plant condition is not sufficient to ensure future health. Such warranty shall not limit the Contractor's liability for defects that may arise beyond the warranty period.

.2 All plant materials shall be reviewed at the beginning of each month from May to September in each year of warranty. Replacements shall be completed within 30 days of receipt of review reports outlining deficiencies.

2.3 WATERING

.1 Regular and adequate watering shall be provided in order to promote healthy plant growth. Watering shall be such that the water penetrates the full depth of the growing medium.

.2 It will be assumed that all plant materials shall be surface watered weekly, dependent on the occurrence of rainfall events and amounts. The Contractor is to provide a weekly watering schedule to the Consultant at the beginning of each week for coordination purposes. Scheduled applications of water shall be skipped only when rainfall has penetrated the soil fully as required and is to be communicated to the Consultant by the Contractor for confirmation. Moisture shall be monitored to avoid overwatering or under-watering. It is the responsibility of the Contractor to ensure that the plant material does not become stressed in dry periods. Should plant materials die due to these dry conditions, the Contractor will be responsible for replacement, per the warranty obligations.

.3 During extended periods of high temperatures and drought, additional watering may be required to promote plant establishment and healthy plant growth. It is the responsibility of the Contractor to ensure plant material does not become stressed in dry periods.

2.4 MAINTENANCE OF PLANTED AREAS AND WEED CONTROL

.1 All planted areas including the base of all trees, shall have weeds removed on a regular basis. Frequency is expected to be at least once per month through the growing season.

.2 Where and when applicable, bark mulch should be replaced, repaired or increased to the specified depth when required by erosion, decay, cultivation or vandalism.

.3 Tree soil saucers shall be maintained to proper shape and depth.

2.5 INSECT, PEST AND DISEASE CONTROL

.1 Contractor shall be responsible for detection, recognition and timely control of plant pests and diseases. Contractor shall have an up-to-date knowledge of the most effective integrated pest management practices, together with the ability to diagnose ailments. All equipment shall be in first class operating condition, completely free of any chemical residual from previous use.

2.6 FERTILIZING

.1 It shall be the responsibility of the Contractor to maintain an adequate level of soil fertility through the application of suitable certified organic complete formulae fertilizers, together with control of soil acidity where and as required. Lime shall be applied to plant areas where acidity is excessive (i.e. below pH 4.5). No lime shall be applied where specific planting requires an acid condition.

.2 Adding fertilizer to newly planted trees that are subjected to transplanting and drought stress may be ineffective for root production and can promote soft growth. If transplanted trees are fertilized, only slow-release fertilizer with ≥50 % water-insoluble nitrogen should be used. Fertilizer shall only be applied in order to correct nutrient deficiencies as required and included under this Item. Fertilizer application shall be subject to approval by the Consultant and shall be applied as per manufacturer’s specifications.

2.7 PROTECTION OF TREES

.1 All trees shall be protected against wind and snow damage by adequate staking, guying, tying or wrapping as conditions require. Guys, wire ties and stakes shall be examined at frequent intervals, and adjustments or renewals made to prevent abrasions or other damage to plants.

2.8 PRUNING

.1 Pruning shall be carried out in order to mitigate hazards, remove dead or broken branches or to ensure proper plant form, structure, vigour and restriction of disease.

.2 Pruning shall be carried out in accordance with current International Society of Arboriculture Best Management Practices (ANSI A300).

.3 Tools shall be sterilized after use on each plant to avoid transmission of disease from one plant to another.

3 EXECUTION

3.1 SCHEDULE AND MAINTENANCE RECORDS

.1 Work Schedule:

.1 Provide a preliminary schedule to the Consultant for review and approval outlining the maintenance tasks outlined in this Section to be undertaken through each year of the warranty period. These shall include as a minimum: fall/spring clean-up, garbage clean-up, pruning, weeding and watering. It is understood that disease/pest control and fertilizing cannot be scheduled.

.2 Maintenance Reports:

.1 The Contractor shall prepare and provide to the Consultant and Owner monthly maintenance reports. Reports to be submitted within five (5) days after month’s end.

.2 Submit a sample format of the monthly maintenance report to the Consultant at the beginning of project construction for review and approval.

.3 Each report shall indicate at minimum project name, date of site visits, areas of work, description of tasks completed, materials used, and outline of future work required, to indicate compliance with these specifications. Lack of information shall infer non-compliance and where there is no evidence of recorded work, this shall have a direct bearing on responsibilities.

END OF SECTION

05500 - Miscellaneous Metal Fabrications

PART 1 - GENERAL

1.1 Related Work

.1 General Concrete Section 03305

.2 Painting Section 09915

.3 Applicable Sections of Division 1

1.2 Reference Standards

.1 Do welding work in accordance with the latest version of CSA W59 unless specified otherwise.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340.

.2 Clearly indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

1.4 Measurement for Payment

.1 Metal fabrication will not be measured separately but will be included in the unit or lump sum price for the work to which it is related.

PART 2 - PRODUCTS

2.1 Materials

.1 Welding materials: to CSA W59.

.2 Bolts and anchor bolts: to ASTM A307.

.3 Galvanizing: un-passivated hot dipped galvanizing with minimum zinc coating of 600 g/sq.m. to CSA G164-M92.

.4 Shop coat primer: to CAN/CGSB-1.40-M89.

.5 Galvanized primer: zinc rich, ready mix to CGSB 1.181.

.6 Grout: non-shrink, non-metallic, flowable, 24h. strength 15 MPa, pull- out strength 7.9 MPa.

.7 Bituminous Paint: Best grade quick drying asphalt utility enamel.

.8 Butyl Tape: Butyl Ribbon tape of required size.

.9 Ferrous Materials

.1 Steel Sections, Plates, Bars and Shapes: CAN/CSA-G40.21, Grade 300W.

.2 Hollow Structural Sections: CAN/CSA-G40.20/G40.21, Grade 350W, Class H.

.3 Rolled Steel Shapes: CAN/CSA-G40.20/G40.21, Grade 350W.

.4 Steel Pipe: ASTM A53, extra strong.

.5 Reinforcing Bars: CAN/CSA-G30.18, Grade 400.

.6 Brackets, Flanges, and Anchors: Cast or formed metal.

.7 Welding Rods and Bare Electrodes: CWB specifications.

.8 Zinc-Coating: Hot-dip galvanized coating for materials in exterior assemblies or exterior walls, 600 g/m^2 to CSA G-164-M92.

.10 Stainless Steel Materials

.1 Plate: ASTM A167, Type 316 or 304.

.2 Bars and Shapes: ASTM A276, Type 316 or 304.

.3 Finish: AISI finish 4.

.11 Aluminum Materials

.1 Extruded structural shapes: 6061-T6.

.2 Smooth plates: 5052-H32.

.3 Checker plate: 6063-T6.

.4 Grating and bearing plates: 6351-T6.

.5 Handrail and posts: 6063-T6.

.6 Pipe: 6351-T6.

.12 Fasteners

.1 Bolts Miscellaneous: Hexagon head type, stainless steel.

.2 Bolts:

.1 For connections – ASTM A325M (galvanized or stainless steel as indicated).

.2 Machine bolts – ASTM A307.

.3 Anchor bolts – CSA G40.21, Grade 300W.

.3 Lag Bolts: Square head.

.4 Machine Screws: stainless steel.

.5 Wood Screws: stainless steel.

.6 Plain Washers: stainless steel.

.7 Drilled-In Chemical Anchors, Hilti Adhesive Type, stainless steel.

.8 Lock Washers: Spring type stainless steel.

.9 Zinc-Coating: Fasteners in exterior assemblies or exterior walls.

.13 Welding

.1 Thoroughly clean all joints to be welded and clean steel exposed for a sufficient area to properly perform the welding operation. Neatly finish all welds. Welds which will be exposed to view shall be continuous welded and ground smooth.

.2 All shop welding shall conform to the requirements of CSA W59 and shall be done by a firm fully certified in accordance with CSA W47.1 Division 1 or 2.1. All welders employed in the field shall be qualified as per CSA W47.1.

.3 All welding operations shall conform to the safety requirements of CSA W117.2.

.4 Schedule of finishes (refer to Contract Drawings for locations and quantities):

.1 Angles at Overhead Door Jambs – Galvanized.

.2 Cast-in-place Angle at Overhead Door Sill – Galvanized.

.3 Loose Steel Beam at Overhead Door – Galvanized.

.4 Loose Steel Lintels at Door and Windows – Galvanized.

.5 Miscellaneous steel trim – Galvanized.

.6 Shelf and relieving angles – Galvanized.

.7 Gratings and associated frames – Aluminum.

.8 Trench drain grating and associated frames – Aluminum.

.9 Sump Pit Covers and associated frames – Aluminum.

.10 Steel Pipe Bollards – Galvanized.

.11 Miscellaneous fabrications as indicated on Contract Drawings – Aluminum.

.12 Rough hardware – Galvanized.

.13 Others as indicated on the Contract Drawings.

2.2 Fabrication

.1 Fit and assemble work in shop, where possible. Execute work according to details and approved shop drawings. Where shop fabrication is not possible, make trial assembly in shop.

.2 Welding shall confirm to requirements of CSA W59 and be done by a fabricator fully approved by the Canadian Welding Bureau, to requirements of CSA W47.1-03 strength of connected members, unless otherwise detailed.

.3 File or grind exposed welds smooth and flush. All welds to be chipped clean.

.4 Weld connection shall be best grade of modern shop and field practice by fabricators known to be recognized manufacturers specializing in this work. Joints and intersection members shall be accurately fitted, made in true planes, with adequate fastening. Build and erect work, plumb, true square, straight, level and accurate to sizes detailed, free

from distortion, or defects detrimental to appearance and performance. All work shall conform to requirements of the local By-laws and all other authorities having jurisdiction.

.5 Check all necessary site dimensions before proceeding with fabrication of work; accept concrete, steel framing and masonry as found and fabricate to “as-built” dimensions.

.6 Use self-tapping shake-proof countersunk headed screws on items requiring assembly by screws or as indicated.

.7 Coat all surfaces in contact with concrete with bituminous paint.

2.3 Shop Finishes

.1 Apply one (1) coat of shop primer to metal items, with the exception of stainless steel, aluminum, galvanized or concrete encased items.

.2 Prime Finish: After fabrication, clean, scrape and remove rust, scale, grease, or extraneous material. Except where specified otherwise, apply a full smooth priming coat in shop, to all miscellaneous metals. Work paint into corners and open spaces and deliver item to site with primer undamaged and to satisfaction of Engineer. Primer shall meet CAN/CGSB-1.40-M89. Consult manufacturer to determine minimum temperature required for application.

.3 Use zinc rich primer on all surfaces, unless hot dip galvanizing is called for.

.4 Galvanized Finish: Where galvanized finish is specified, prepare, work and hot dip galvanize in accordance with CSA G164-M92. Items shall be galvanized after fabrication where possible. Coating shall be applied at the rate of 600 g per square meter (2 oz. per sq. ft.).

PART 3 - EXECUTION

3.1 Fabrications

.1 Fabricate in accordance with CSA Standard S16, accepted shop drawings and all applicable codes and standards.

.2 Undertake all welding activities to CSA W59. Grind all field welds flush and smooth.

.3 Clean steel in accordance with SSPC 6 'Commercial Blast Cleaning'. Complete finishing system according to schedule.

3.2 Erection and Installation

.1 Erection in accordance with CSA Standard S16 or install according to other applicable CSA standards.

.2 Erect all items in accordance with reviewed shop drawings.

.3 Fit joints and intersecting members accurately. Make Work in true planes with adequate fastenings. Build and erect Work perfectly rigid, plumb or true to slope, square, straight, level and accurate to sizes detailed, free from distortion or defects detrimental to appearance or performance.

.4 Isolate dissimilar materials to prevent electrolysis.

.5 Touch-up all damaged coatings after erection.

3.3 Clean-Up

.1 Promptly as the Work proceeds and upon completion, clean-up and remove from the site, the rubbish and surplus material resulting from the Work of this Section.

END OF SECTION

07411 – Prefinished Metal

PART 1 - GENERAL

1.1 General

.1 The specifications are an integral part of the Contract Documents.

1.2 Work Included

.1 Vented soffit.

1.3 Reference Standard

.1 CGSB 93.1-M85.

1.4 Examination

.1 Examine substrate before installation. Commencement of work indicates acceptance of conditions.

1.5 Submittal

.1 Submit colour samples, to the Engineer for approval, for each of the different types of application prior to commencing the work.

PART 2 - PRODUCTS

2.1 Materials

.1 Soffit - prefinished perforated metal, 24 ga., V-rib soffit panels.

.2 Colour to be manufacturer’s standard white.

2.2 Manufacturers

.1 Reynolds, Kaiser or approved equal.

PART 3 - EXECUTION

3.1 Installation

.1 Install strictly as per manufacturer's instructions.

.2 Use concealed fasteners where possible.

.3 Protect aluminum (by backpainting / from contact with dissimilar metals).

.4 Make provision for expansion and contraction.

.5 Protect adjacent materials from damage.

3.2 Touch Up

.1 Touch up all scratches resulting from installation procedures.

3.3 Clean Up

.1 Leave adjacent work free of defects caused by this installation.

END OF SECTION

07900 - Caulking

PART 1 - GENERAL

1.1 General

.1 The specifications are an integral part of the Contract Documents.

1.2 Work Included

.1 Include: caulking at all openings and joints.

1.3 Environmental Conditions

.1 Apply caulking and sealant only to completely dry surfaces and at air and material temperatures above minimum established by manufacturer's specifications.

1.4 Guarantee

.1 Provide a written guarantee that caulking work is guaranteed for 3 years against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion or staining adjacent surfaces.

PART 2 - PRODUCTS

2.1 Materials

.1 Sealant - one part - Tremco or approved equal.

.2 Backing - Tremco Joint Backing.

.3 Void Filler - loose glass fibre.

.4 All materials suitable for specific application.

PART 3 - MATERIALS

3.1 Preparation

.1 Remove by brushing, scrubbing, scraping or grinding loose mortar, dust, oil, grease, oxidation and all other materials affecting bonds of sealant and caulking to adjacent materials.

3.2 Application

.1 Work of this section shall include all caulking except where specified under the work of other sections, to make the building weathertight as indicated typically on drawings and as otherwise specified.

END OF SECTION

09915 – Painting & Finishing *(As Applicable)*

PART 1 - GENERAL

1.1 Work Included

.1 Supply and install:

.1 Painting to exterior galvanized steel.

1.2 Reference Standards

.1 Do work in accordance with CAN/ULC-S705.2 and the Canadian Painting Contractors Association "Architectural Painting Specification Manual".

1.3 Submittals

.1 Submit colour samples and product data sheets for approval.

1.4 Measurement for Payment

.1 Payment for surface preparation and painting will not be made directly but shall be included in the lump sum price bid.

PART 2 - PRODUCTS

2.1 Exterior Painted Galvanized Steel

.1 First Coat: Galvanized Metal Primer (Sherwin Williams, Dulux or Benjamin Moore).

.2 Finish Coats: Gloss Alkyd (Sherwin Williams, Dulux or Benjamin Moore).

2.2 Colour Code

.1 Beam and Columns - Black

.2 Ceiling Soffit – White.

PART 3 - EXECUTION

3.1 General

.1 Touch up shop applied finishes damaged during installation.

.2 Apply finish coats to shop primed equipment.

3.2 Protection of Surfaces

.1 Protect surfaces not to be painted and if damaged, clean and restore such surfaces as directed.

.2 Apply primer, paint, or pre-treatment as soon as possible after surface has been cleaned and before deterioration of surface occurs.

.3 If rusting occurs after completion of surface preparation, clean surfaces again.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalids, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.

.5 Protect cleaned and freshly painted surfaces from excessive dust.

3.3 Mixing Paint

.1 Do not dilute or thin paint for brush application; use as received from manufacturer.

.2 Mix ingredients in container before use and ensure breaking up of lumps, complete dispersion of settled pigment, and a uniform composition.

.3 Mix paint often enough during application to keep pigment in suspension and composition uniform.

.4 Do not mix or keep paint in suspension by means of air bubbling through paint.

.5 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from the manufacturer and provide a copy of instructions to Engineer.

3.4 Applying Paint

.1 Apply paint by brushing, spraying or a combination of both. Use sheepskins or daubers only when no other method is practical in places of difficult access.

.2 Use dipping or roller coating method of application only when specifically authorized by Engineer in writing.

.3 Caulk open seams at contact surfaces of built up members with red lead paste, or other approved material. Apply second coat of primer to caulked areas.

.4 Where surface to be painted is not under cover, do not apply paint when:

.1 Air temperature is below 5°C or when temperature is expected to drop to 0°C before paint has dried.

.2 Temperature of surface is over 50°C unless paint is specifically formulated for application at high temperatures.

.3 Fog or mist occur at site; it is raining or snowing; there is a danger of rain or snow; relative humidity is above 85%.

.4 Surface to be painted is wet, damp or frosted.

.5 Previous coats are not dry.

.5 When paint must be applied in damp or cold weather apply paint under cover. Protect, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified in Section 3.7.4. Protect until paint is dry or until weather conditions permit.

.6 Permit drying of applied paint which has been exposed to freezing, excess humidity, rain, snow or condensation. Remove paint from damaged areas, prepare surface again and repaint same as undamaged areas.

.7 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.

.8 Brush application:

.1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.

.2 Brush out runs and sags.

.3 Leave a minimum of brush marks in finished paint surfaces.

.4 Remove runs and sags from finished work and repaint.

.9 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.4 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.5 Brush out immediately all runs and sags.

.6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.7 Remove runs and sags from finished work and repaint.

.10 Shop painting:

.1 Do shop painting after fabrication and before any damage to surface occurs from weather or other exposure.

.2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.3 Do not paint metal surfaces which will be embedded in concrete.

.4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.

.5 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of boiled linseed oil or other approved protective coating after shop fabrication is completed.

.6 Remove weld spatter before painting. Remove weld slag and flux.

.11 Field Painting:

.1 Paint steel structures as soon as possible.

.2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts and damaged or defective paint and rusted areas.

.3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection, but which will not be accessible after erection.

.4 If possible do not apply final coat of paint until concrete work is completed. If concreting or other operations damage any paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.

.5 Where painting does not meet with requirements of specifications, and when so directed by Engineer, remove all defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

END OF SECTION

PART 1 – GENERAL

1.1 Scope of Work

.1 Provide all products and services mentioned or shown in the Contract Drawings with all incidentals necessary for the site.

.2 Removal of existing luminaires, poles, arms and overhead and underground wiring back to power source as indicated on drawings. Selected luminaires, poles and arms to be relocated as indicated in the contract drawings. Contractor to verify operation of existing equipment prior to re-installation. Notify Engineer of non-functioning equipment.

.3 Supply and install all LED lighting for pathways, pavilion, roadway and area lighting as indicated in the contract drawings. Include all poles, arms and mounting hardware required.

.4 Provide new breakers in existing panelboards. Coordinate with panel manufacturer for recommended breakers and installation requirements.

.5 Provide lighting control system for pavilion pathway lighting as indicated in contract drawings.

.6 Provide sound tent receptacle post including weatherproof receptacles and lockable weatherproof junction box, as shown in the contract drawings.

.7 Provide all necessary wiring, connections and conduit, underground duct (including termination materials) to existing power panels.

.8 Prior to starting work co-ordinate site services with owner. Perform all necessary “locates” prior to excavations and digging.

.9 Provide all required equipment, verification, testing and commissioning as required by this specification.

.10 All necessary ESA inspections, with a final certificate. Submit copy to Consultant for review, as it will be required for final acceptance of work.

.11 Submit shop drawings for all new equipment and device for review by Consultant prior to ordering.

1.2 Standards

.1 Provide all products and services in accordance with the latest addition of the following codes and standards:

- .1 Ontario Electrical Safety Code (OESC), latest edition applicable.
- .2 Canadian Standards Association.
- .3 Ontario Building Code, Latest Edition.

1.3 Permits, Fees and Inspection

.1 Coordinate all requirements for power service and electrical inspection with local hydro authority.

.2 Provide all licenses, permits and certificates required by the local authorities at no additional expense.

.3 Arrange and pay for inspection(s) of the Works by the authorities having jurisdiction.

.4 Upon completion of the Work, provide the Consultant with final, unconditional certificates of approval by the local inspection authorities.

1.4 Examination of the Site and Contract Documents

.1 Examine Drawings and Specifications of the complete Project and become familiar with all local site conditions.

.2 Submission of Tender confirms the Contractor accepts the Contract and site conditions without qualifications.

.3 Failure to determine the existing conditions or the nature of the construction shall not be a basis for granting compensation.

1.5 Construction Drawings

.1 The electrical drawings are diagrammatic, intended to convey the scope of work and indicate general arrangements of equipment. **Do not scale drawings unless a scale is identified.**

.2 Have the location of panels, conduits, luminaires, outlets and other equipment shown in the drawings reviewed by the Consultant before proceeding with the installation. Inform the Consultant of significant changes in location of equipment to meet field conditions and receive their authorization before proceeding. Review with Consultant the location of equipment not identified on the drawings.

.3 Locations of panels, outlets, luminaires and other equipment indicated in the drawings are approximate and may be subject to revision found necessary or desirable by the Consultant at the time the work is installed. The Consultant may at their discretion request the relocation of electrical equipment within three metres of that shown prior to roughing in. This relocation shall be at no additional cost.

.4 Drawings do not generally indicate the number of wires within conduits for outlets and fixtures. Provide the correct wire size and quantity as required by the indicated circuitry and control diagrams.

1.6 Shop Drawings

.1 Submit shop drawings in accordance with general Contract Conditions and include arrangement drawings, bill of materials, diagrams, nameplate drawings and product data as applicable for the following equipment:
- .1 Luminaires and poles
- .2 Grade level box
- .3 Receptacles and Breakers
- .4 Lighting contactor control panel.

.2 Shop drawings shall provide all necessary details and information:
- .1 to allow the Consultant to assess that equipment is in accordance with Contract requirements;
- .2 to be suitable for binding into the operations and maintenance manuals; and
- .3 to be stamped and signed by the Contractor, thereby indicating that they have checked that the equipment offered conforms to the requirements of the Contract Documents.

.3 Product data sheets shall include the name of the manufacturer and be clearly marked to show which items, features and options are offered.

.4 Shop drawings that are not presented as required will be returned for revision and resubmission.

.5 Shop drawings will be returned marked ‘Non Conforming – Revise and Resubmit,’ ‘Conforms with Design Intent with Revisions Noted’ or ‘Conforms with Design Intent’. Do not procure or start manufacture before receipt of submitted drawings stamped as ‘Conforms with Design Intent with Revisions Noted’ or ‘Conforms with Design Intent’ by the Consultant.

.6 The review of shop drawings by the Consultant does not relieve the Contractor of their responsibilities for compliance with the Contract Documents and the OESC.

1.7 Construction Record Drawings (As Builts)

.1 Keep one set of all applicable contract (including updates) and shop drawings at the site.

.2 Ensure that the latest issue drawings are marked up to reflect the work as installed and have these available for the Consultant’s review at site.

.3 Upon completion of the work, transfer all revisions to a clean set of prints and update electronic AutoCAD drawings submit them to the Consultant as part of the final job documentation.

1.8 Operating and Maintenance Manual

.1 Produce operating and maintenance manuals for all Division 16 work and submit two complete preliminary copies for the Consultant’s review.

.2 Submit four final approved copies of the operating and maintenance manuals at project completion.

.3 Coordinate installation of materials and equipment with work of other trades. Report any conflicts to the Consultant.

.4 Coordinate with local utilities (hydro and telephone) and obtain all necessary information to ensure proper functioning of all the installed equipment. Notify the Consultant in writing of any resultant changes.

.5 Relocate equipment and/or material installed, but not coordinated with the work of other trades as directed by the Consultant, at no extra cost.

.6 Confirm with the utility (Hydro One Networks Inc.) all aspects of primary and secondary power supply, including trenching, cabling, grounding and metering.

1.9 Finishes

.1 Shop-finish metal enclosures by application of rust resistant primer inside and out, and at least two coats of finishing enamel.

.2 Clean and touch up any surfaces on shop-painted surfaces marred during shipment or installation with paint selected to match the original.

.3 Wire brush and prime using a zinc-rich coating on any non-coated steel hangers, racks and fasteners to prevent rusting.

1.10 Equipment Identification

.1 Provide nameplates for all electrical equipment listing equipment identifier and function.

.2 Nameplates:

.1 Lamicoid 3 mm thick plastic engraving sheet, black face, white ore, mechanically attached with stainless steel screws or rivets.

NAMEPLATES:

Size 1: 1 line, 3 mm high letters

Size 2: 1 line, 6 mm high letters

Size 3: 2 lines, 6 mm high letters

Size 4: 1 line, 12 mm high letters

Size 5: 2 lines, 12 mm high letters

Size 6: 1 line, 25 mm high letters

Size 7: 2 lines, 25 mm high letters

.3 Wording on nameplates to be approved by Consultant prior to manufacture.

.4 Allow for average of twenty-five (25) letters per nameplate, identification to be English.

.5 Disconnects, starters and contactors: Size 4, indicate equipment description and voltage.

.6 Terminal cabinets, pull and junction boxes: Size 2, indicate panelboard system and voltage.

.7 Transformers: Size 5 indicate tag number, kVA capacity, phases, primary and secondary voltages.

.8 Provide a typewritten circuit directory with clear plastic cover for each panel board in a suitable holder on the inside of each panel door. Indicate breaker circuit number, rating, load description, and associated load data. On outside of panel board door, indicate tag number, capacity, phases and voltages.

.9 For all buried incoming ducts provide a “buried cable” marker on building where buried service enters.

1.11 Fireproofing

.1 Where sleeves or openings are installed in walls, floors, roof or partitions to accommodate raceways, cables or bus duct, provide all necessary seals, fittings, barriers and fire-resistant materials to restore the installation to its original fire rating to the satisfaction of the Building Code, governing authorities and the Owner’s insurance underwriters. Work To be completed by authorized fire proofing contractor.

PART 2 – PRODUCTS

2.1 Basic Materials

.1 Grounding

.1 Ground and bond metallic water pipes and electrical equipment in accordance with hydro requirements.
.2 Ground secondary surge protection to 3mx20mm galvanized steel ground rod buried at position of protective device without damage to other services.
.3 Install an AC ground grid system as per OESC - Section 10.

.2 Conduits and Fittings
.1 Minimum conduit size: 21mm
.2 Provide Electrical Metallic Tubing (EMT) for all indoor installations. Provide fittings with insulated compression type connectors, sprinkler proof (set screw type not acceptable).
.3 Rigid, threaded, galvanized conduit for installations in exposed runs where subject to damage and where required by code.
.4 PVC DB2 conduit, CSA approved, size as required (min. 78mm), for duct banks direct buried and concrete encased
.5 All exterior exposed conduits to be rigid PVC conduit, UV sunlight resistant.

.3 Wire and Cable
.1 Power distribution and lighting circuits. Single conductor stranded copper conductors, minimum #12AWG minimum with 600V Rated RW90 insulation for installation in wire-ways or conduit.
.2 Power wiring to mechanical equipment: single conductor, Class B stranded copper, minimum size #12AWG minimum, 600V rated, RW90 insulation for installations in conduit. Include an insulated green conductor for ground wire.
.3 Power wiring to all equipment: #12AWG minimum, solid copper, RW90, XLPE, two ground wires (1-bare, 1-insulated green), c/w interlocking aluminium armour and insulated grommets when entering boxes. Wiring must be CSA approved and equal to AC90 ISO-BX.
.4 Size wiring as per electrical code for all loads, with minimum #12AWG wire size.
.5 Control circuits (120V): single conductor, Class B standard copper, minimum size #14AWG, 600V rated, RW90 insulation for installations in conduit. Include an insulated green conductor for ground wire.
.6 Contractor to verify voltage drop per rating for each load from panelboard.

.4 Wiring Devices
.1 Refer to drawing specifications.
.2 AC Receptacles: Industrial grade, 15A-125V AC rated with CSA type 5-15R configuration or 20A-125V AC rated T-slot with CSA type 5-20R configuration (as indicated on drawings), U ground and CSA approved. Single or duplex receptacle as indicated on drawings
.3 Indoor cover plates: stainless steel to match single or multi-gang receptacles or light switches.
.4 Outdoor Receptacle Covers: Weatherproof (WP), UV rated, extra duty, and “While-In-Use” type with continuous plastic cover complete with gaskets for duplex receptacle as indicated. Must be CSA and approved by Electrical Inspector (see code ruling 26-708 and ESA bulletin 26-29-3).

.5 Selector Switches
.1 Maintained contact type, 30mm two or three positions (as indicated), heavy-duty, oil-tight, operators standard knob, contact arrangement as indicated rated 5A at 120V AC, labels as indicated.
.2 Selector switch ratings:
.3 EEMAC/NEMA type 13 for indoor control panels.
.4 EEMAC/NEMA type 4X for outdoor control panels.
.5 EEMAC/NEMA type 7 suitable for Class 1, Zone 1 & 2 hazardous areas.
.6 Acceptable manufacturers: Allen-Bradley, Cutler-Hammer, Siemens, and Square D (Schneider).

.6 Indicating Lights
.1 30mm Heavy duty – oil tight, universal LED, lens colour: as indicated, supply voltage: 120 V or as indicated in contract drawings, labels as indicated.
.2 Indicating light ratings:
.3 EEMAC type 13 for indoor control panels.
.4 EEMAC type 4X for outdoor control panels.
.5 EEMAC/NEMA type 7 suitable for Class 1, Zone 1 & 2 hazardous areas.
.6 Acceptable manufacturers: Allen-Bradley, Cutler-Hammer, Siemens, and Square D (Schneider).

.7 Lighting Contactors
.1 Contactors: to EEMAC No. 1CS-1970.

.2 Permanent magnet latch type controlled by pilot devices as indicated and rated for type of load controlled. Half size contactors not accepted.
.3 Complete with 2 normally open and 1 normally closed auxiliary contacts unless indicated otherwise.
.4 Contactor to include enclosure, disconnect switch – interlocked with enclosure door, control transformer with primary and secondary fusing, indicating lights, selector switches, pushbuttons, etc.
.5 Acceptable manufacturers: Allen-Bradley, Cutler Hammer, Siemens, GE and Square D (Schneider).

2.2 Lighting Equipment

.1 Refer to Contract Drawings for all lighting products (i.e., luminaires, exit signs, emergency lighting units, etc.).

.2 Provide all necessary mounting brackets, hangars, etc., as required for installation.

.3 Upon delivery of lighting on site and quantities accounted for, the Electrical Contractor will assume liability for damaged, lost, stolen, etc., luminaires, poles and all accessories.

.4 Electrical Contractor is responsible for installation and warranty service for all non-luminaire-occurring failures.

PART 3 – EXECUTION

3.1 Installation – General

.1 Install and/or connect equipment as indicated, complete with conduit and wiring, and mounting hardware.

.2 Provide required power wiring for all mechanical equipment, including heating and ventilation equipment. Low voltage control wiring will be done under Division 15.

.3 Install main power distribution equipment on melamine backboards, at location shown. Arrange equipment generally as shown in the Contract Drawings. The exact locations and arrangements shall be determined at site and coordinated with the owner.

.4 Mount all electrical equipment square and plumb to exhibit a neat and tidy installation.

.5 Balance electrical loads across the phases after final installation.

.6 Provide a label for all equipment, junction boxes and pull boxes.

.7 Do any penetrations through fire separations in accordance with the required codes.

.8 Perform tests in accordance with manufacturer’s recommendations.

3.2 Grounding

.1 Provide a complete grounding system in accordance with the code and any service having jurisdiction.

.2 Ground all electrical equipment, including distribution panels, lighting fixtures, motors, conduits, receptacles, wiring and control devices. Ensure conduits make a good mechanical connection at all points to maintain a continuous metallic ground throughout the complete system.

.3 Ground all plumbing and mechanical services inside buildings to ensure that no item of equipment is left electrically isolated.

.4 Provide ground bushings to all stubbed-up metallic conduits under panels and interconnect to ground bus with grounding conductor.

.5 Provide grounding electrodes in accordance with the requirements of the code and any service authority having jurisdiction.

.6 Provide separate insulated ground wire in all metal or plastic conduits buried in earth or installed in or below concrete slabs.

.7 Provide separate ground conductor through all flexible conduit connections.

3.3 Testing and Commissioning

.1 Provide testing and commissioning of all electrical work. Notify the Consultant at least three working days before the testing and commissioning is scheduled to start. The Consultant may request repetition of any test for which due notification was not received.

.2 Provide insulation test using 500V megger on the utility supply cables.

END OF SECTION

Section F

Contract Drawings

Note: Contract Drawings are included as a separate PDF

Contract Drawings
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