

CONTRACT DOCUMENTS

St. Regis Police Station Site Upgrades

PROJECT NO. 24-5090F

MOHAWK COUNCIL OF AKWESASNE

September 2026

Prepared by

Jp2g Consultants Inc.

Engineers • Planners • Project Managers

1150 Morrison Drive, Suite 410

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**TENDER FOR
PROJECT NO. 24-5090F – ST. REGIS POLICE STATION SITE UPGRADES**

Tenders, sealed in envelopes and clearly marked as to the contents, will be received by Leslie Papineau, Director Department of Infrastructure, Housing, and Environment, Mohawk Council of Akwesasne, 101 Tewasateni Road Akwesasne, Ontario K6H 0G5 until:

11:00 a.m., Local Time, Thursday, October 8, 2026

for the construction of the works described below.

On the same day, commencing at 11:05 a.m. local time, the tenders will be opened and read publicly at the Cornwall Island Administration Office #3 on Cornwall Island.

St. Regis Police Station Site Upgrades Project No. 24-5090F– The work consists of removal of existing fence, concrete, and asphalt, localized civil improvements including: tree limbing, concrete curb and walkway, excavation of landscape areas and installation of granular sub-base and base, scarifying and reshaping existing granular materials, paving, fencing and line painting. Electrical improvements include: new power, controls, and communications requirements for the new pivot gate, push buttons, and traffic loop. This includes ducting, wiring, connection to existing power and communications inside the police station, testing, and commissioning.

Plans, specifications and tender forms may be obtained from Mohawk Council of Akwesasne, Cornwall Island Administration Building No. 3, Cornwall Island, Ontario.

Tenders must be accompanied by a tender deposit payable to the Mohawk Council of Akwesasne as follows:

- for First Nations contractors in the form of a certified cheque, bank draft or money order in the amount of **10% of the total tender price to a maximum of \$20,000**
- for all other contractors as a **Bid Bond for an amount equal to 10% of the total tender price.**

Evaluation of all tenders will follow the Tendering Policy of the Mohawk Council of Akwesasne, which is intended to increase the participation of local and other Aboriginal businesses in construction and materials supply contracting.

Tenders are subject to a formal contract being prepared and executed. The Council reserves the right to reject any or all tenders and the lowest or any tender will not necessarily be accepted.

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Leslie Papineau, OAA, MRAIC, Director
Department of Infrastructure, Housing, and Environment
Mohawk Council of Akwesasne
101 Tewasateni Road
Akwesasne, Ontario K6H 0G5
Telephone: (613) 936-1548x1005
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**TENDER FOR
PROJECT NO. 24-5090F – ST. REGIS POLICE STATION SITE UPGRADES**

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**TENDER FOR
PROJECT NO. 24-5090F – ST. REGIS POLICE STATION SITE UPGRADES**

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TENDER FOR
PROJECT NO. 24-5090F – ST. REGIS POLICE STATION SITE UPGRADES
BIDDER’S CHECK LIST

(to be enclosed in the Tender envelope)

BEFORE SEALING THE ENVELOPE, PLEASE CHECK THAT THE FOLLOWING HAS BEEN DONE:

1. (a) Has your tender been signed?
 (b) Has your seal been affixed?
2. Have you enclosed the required Tender Deposit?
3. Have you enclosed an Agreement to Bond signed and sealed by proposed surety?
4. Have you enclosed the COMPLETE written Form of Tender?
5. Has the “Statutory Declaration re: Tender” been completed and included in this submission?
6. All Addenda issued should be signed and included in your tender submission.

NOTES:

- (i) Your Tender will be informal and may be disqualified if ANY of the foregoing points have not been complied with.
- (ii) Make sure that you seal the tender envelope and clearly mark it as to its contents.

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1. GENERAL INVITATION:

The intent of this package is to obtain an offer to perform work to complete:

The project, St. Regis Police Station Site Upgrades includes improvements to the existing parking lot/access and installation of new fencing and controls.

The Contract Documents are identified as:

Mohawk Council of Akwesasne
St. Regis Police Station Site Upgrades
Project No. 24-5090F

Prepared by:

Jp2g Consultants Inc.
Engineers · Planners · Project Managers
Ottawa, Ontario

Offers signed under seal, executed and dated, will be received by The Mohawk Council of Akwesasne at the Department of Infrastructure, Housing, and the Environment, Cornwall Island Administration Building No. 3, Cornwall Island, Ontario before 11:00 a.m. local time, on the 8th day of October 2026.

Address Bids to:

Leslie Papineau, Director
Department of Infrastructure, Housing, and Environment
Mohawk Council of Akwesasne
101 Tewasateni Road
Akwesasne, Ontario K6H 0G5

Title of Project:

Mohawk Council of Akwesasne
St. Regis Police Station Site Upgrades
Project No. 24-5090F

**INSTRUCTIONS
TO
TENDERERS**

- Tenders must be legible, written in ink, or by typewriter, and all items must be bid, unless the tender specifically permits otherwise, with the price for every item clearly shown.
- The insertion of written or typed additions to the tender forms, by the Tenderer, will invalidate the tender.
- All bids must be submitted on the appropriate “Form of Tender” bound with this document

Directions:

Completely fill in all blank spaces in the Tender documents.

State numbers in words as well as figures where requested.

The Officer of the Bidding Firm must sign the Tender Form in longhand and affix the Corporate Seal.

Completed Tender shall be without interlineations, alterations, mathematical errors, or erasures.

Tenders which are late or which fail to comply with requirements of the Tender Documents shall be considered informal and may be rejected.

Tender Forms and enclosures, which are improperly prepared, may be declared informal.

Failure to provide security deposit and/or insurance requirements may result in the tender being declared informal.

Each item in the Tender Form shall be a reasonable price for each item under no circumstances will an unbalanced tender be considered. The Construction Manager and/or Engineer will be judges of such matters and should any tender be considered to be unbalanced, then it will be rejected.

When requested by the Owner or Consultants, satisfactory evidence of authority of any signatory on behalf of the Bidder shall be furnished. In the event that the Bidder is in partnership or joint venture, its execution of the contract shall constitute the agreement of each partner to be jointly and severally.

Upon obtaining Bid Documents, each Bidder shall designate an address or telephone/fax number to which the addenda should be directed.

Before Submitting Tender, Bidder Shall:

Carefully examine all drawings and specifications and include in the quotation sufficient sums to cover the cost of all items included in the Contract.

2. DESCRIPTION OF WORK

The work to be done under this contract consists of supplying all materials, all required equipment, labour and services for the construction of all facilities and appurtenances, as shown on the Contract Drawings and specified herein. Coordinate with the Construction Manager with respect to all other Contractors working on related works, as appropriate, to ensure the orderly reconstruction of the St. Regis Police Station Site Upgrades in St. Regis.

The tender covered by this document includes the following general scope of work.

St. Regis Police Station Site Upgrades Project No. 24-5090F– The work consists of removal of existing fence, concrete, and asphalt, localized civil improvements including: tree limbing, concrete curb and walkway, excavation of landscape areas and installation of granular sub-base and base, scarifying and reshaping existing granular materials, paving, fencing and line painting. Electrical improvements include: new power, controls, and communications requirements for the new pivot gate, push buttons, and traffic loop. This includes ducting, wiring, connection to existing power and communications inside the police station, testing, and commissioning.

3. TENDER DEPOSITS OR BID BOND

Each tender shall be accompanied by a tender deposit in the form of a certified cheque, bank draft or money order made payable to the Mohawk Council of Akwesasne, as follows:

- For First Nation contractors in the form of a certified cheque, bank draft or money order for **10% of the total tender price, to a maximum of \$20,000.**
- For all other contractors as a **Bid Bond for an amount equal to 10% of the total tender price.**

The tender deposit or Bid Bond **MUST BE ENCLOSED IN THE SAME ENVELOPE AS THE TENDER.** A tender which does not comply with these requirements shall be considered an improper tender and may be rejected.

The tenderer agrees that in submitting his tender, the required certified cheque, bank draft, money order or bid bond is a fair estimate of damages that may be incurred by the Council as a result of the tenderer failing to enter into the required Contract.

All tender deposits or bid bonds will be returned to the respective bidders within ten days after the tenders have been opened, except the deposit or bid bond of the bidder which the Council elects to retain as the successful bidder. If the bidder fails to enter into a contract

- where a certified cheque was provided for bid surety, the cheque will be cashed and the funds used to make up the difference between the low bid and the next acceptable bid up to the value of the cheque. Unused funds will be returned to the issuer.
- where a Bid Bond was provided for bid surety, the Bonding Company will make up the difference between the low bid and the next acceptable bid up to the value of the bond.

The tender deposit of the successful bidder will be returned when he has fully complied with the conditions outlined in the tender documents.

4. PERFORMANCE AND PAYMENT BONDS

A performance bond in an amount equal to one hundred percent (100%) of the total tender price with a satisfactory Guarantee Surety Company, authorized to carry on business in the Province of Ontario and Quebec, will be required for the faithful performance of the Contract, including the maintenance and warranty period of one (1) year from the date of Substantial Performance.

A labour and material bond in an amount equal to one hundred percent (100%) of the total tender price with a satisfactory Guarantee Surety Company, authorized to carry on business in the Province of Ontario or Quebec, will be required for the faithful payment of all labour and materials related to this Contract.

For native contractors who, because of the Indian Act, are unable to obtain a Performance Bond, an alternate arrangement may be accepted by Council upon receipt of proof of refusal to bond from two bonding companies. The acceptable alternative arrangement will be a performance deposit in the form of a certified cheque, bank draft or money order made payable to the Mohawk Council of Akwesasne for an amount equal to 10% of the total tender price, to a maximum of \$20,000. An irrevocable letter of credit from a bank or an approved financial institution in favour of Mohawk Council of Akwesasne for the amount indicated shall also be acceptable.

5. SALES TAX

This project is to be constructed on Mohawk Territory of Akwesasne therefore is exempt from Provincial and Federal Sales Taxes including the Goods and Services Tax.

6. INSURANCE

The Tenderer shall provide proof that their personnel are fully covered under the Workers Compensation Act, and that their company and workers carry liability and property damage insurance.

Provide a signed “undertaking of insurance” on a standard form provided by the Insurance Company stating their intention to provide insurance to the Tenderer in accordance with the insurance requirements of the Contract Documents.

The Tenderer shall procure and maintain “**All Risk and Liability Insurance**” in accordance with **Sections 20 and 21** of the General Conditions and the requirements set out below unless otherwise specifically stated in the Contract.

The tenderer whose tender has been recommended to the Owner for acceptance shall, on receipt from the Owner of the Agreement for execution, procure and maintain All Risk and Liability Insurance and shall file with the Owner, together with the Agreement executed by him, a Cover Note of such All Risk Insurance and a Certificate of Liability Insurance. The Contractor shall file with the Owner prior to the first progress payment the original policy of such All Risk Insurance or a Certificate of Insurance clearly stating that the requirements hereof. Insurance shall be obtained from a company satisfactory to the Owner.

- (a) The All Risk Insurance shall:
- (1) comply with the requirements of the "Specification for All Risk Insurance" as attached hereto, which specification shall form part of the said policy of All Risk Insurance.
 - (2) be maintained until the Date of Completion of the works has been established as set out in Certificate of Completion and M.C.A. has notified the Tenderer in writing that the Owner has arranged its own All Risk Insurance coverage of the permanent works.
- (b) The Liability Insurance shall:
- (1) have a limit of liability of not less than **\$3,000,000** inclusive for any one occurrence;
 - (2) be Comprehensive Liability Insurance covering all operations and liability assumed under the Contract with the Owner;
 - (3) not contain any exclusions or limitations in respect of shoring, underpinning, raising or demolition of any building or structure, pile driving, caisson work, collapse of any structure or land from any cause;
 - (4) include insurance against liability for bodily injury and property damage caused by vehicles owned by the Contractor and used on the work, and in addition, shall include insurance against liability for bodily injury and property damage caused by vehicles not owned by the Contractor and used on the work. Each such insurance shall have a limit of liability of not less than **\$3,000,000** inclusive for any one occurrence. A "vehicle" shall be as defined in the Highway Traffic Act of the Province of Ontario;
 - (5) be endorsed to provide that the policy or policies will not be altered, cancelled or allowed to lapse without thirty days written notice to the Owner;
 - (6) be endorsed to include the Owner, the Construction Manager, the Engineer and the Geotechnical Sub-consultant as additional named insured.

NOTE: All insurance shall be obtained from companies satisfactory to the Council. The Contractor will pay for all premiums and expense incurred with the insurance. A certified copy of such insurance policy shall be furnished to the Construction Manager before any work is commenced.

7. TENDER FORM REQUIREMENTS

The Contractor, in submitting the price, agrees to complete the Work by the date indicated in the Contract Documents, but may suggest a revision to the Contract Time with an adjustment to the overall price. The Owner requires that work under this contract be completed within the time period stated.

Bidders shall be solely responsible for the delivery of their Tenders in the manner and time prescribed. Contractor shall accept sole responsibility for any error or neglect to include any sums.

Submit **two** copies of the executed Tender on the forms provided, signed and corporate sealed in a closed opaque envelope, clearly identified with bidders name, project name, and Owners name on the outside.

A list of submitted tenders will be made public, following tender opening. Offers will be opened publicly immediately after the time for receipt of tenders.

Indicate the amount of Native content in your tender as a percent.

Quotations from Bidders shall not contain any recapitulation of work to be done. No oral or telephone proposals or modifications will be considered. Neither the Consultant nor Engineer nor Owner shall be responsible for oral instructions.

8. DISCREPANCIES

Bidders finding discrepancies or omissions in the drawings, in the specifications, or any other documents, or doubts as to the meaning or intent of any information thereof, shall notify the consultant. Any questions or concerns must be received three (3) working days before tender close. All clarifications, instructions, or explanations will be sent to all tenderers.

Direct Inquiries To:

Department of Infrastructure, Housing, and Environment

Mohawk Council of Akwesasne

101 Tewasateni Road

Akwesasne, Ontario K6H 0G5

Attention: Daryl Seymour, P.Eng Capital Planning and Development Engineer

Email: daryl.seymour@akwesasne.ca

9. ADDENDA

An Addendum may be issued during the Tender period. All addenda are part of the contract documents and all costs shall be included in the final price. Verbal answers are only binding when confirmed by written addenda.

Clarifications requested by bidders must be in writing **not less than three days before date set** for receipt of bids. The reply will be made in the form of an addendum.

10. AWARD OF TENDER

The Owner will not entertain requests for gratuitous payments arising from errors alleged to have been in the accepted tender.

Amendments to a submitted offer will be permitted if received in writing prior to Tender closing and if endorsed by the same party or parties who signed and sealed the offer.

Under no circumstances will tenders be considered which are received after the local time in the advertised closing date for Tenders.

Tenders once opened in the presence of the Consultant/Owner/And Witness, shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date. After this time, the tender may only be accepted with the consent of the successful bidder.

The Owner has the right to accept or reject any or all offers. After acceptance, the Mohawk Council of Akwesasne will issue a letter of intent to enter into a contract for the work.

It is a condition of the tender that Mohawk labour or Mohawk sub-contractors are used for this project wherever possible. Preference will be given to tenders within the project budget, which have the highest Mohawk labour content.

The Owner may, in its sole and absolute discretion, waive any informality or irregularity. The Owner may also negotiate any of the provisions of a Bid with the respective Bidder. Negotiations may result in changes to a Bid without necessarily entering into similar negotiations with any or all other bidders.

Upon award of tender, the successful bidder shall be required to submit upon request, **within 48 hours** from tender opening, additional breakdowns of the lump sum prices indicated in the Form of Tender. These additional breakdowns will be used for the purposes of establishing monthly payments. The Engineer reserves the right to modify any items that appear unbalanced.

The successful bidder shall commence work at the site within **seven calendar days** of receipt of the letter of intent.

Failure by the successful bidder to meet the above requirements will entitle M.C.A. to cancel the award of the contract due to the successful bidder's default. M.C.A. may then award the contract to one of the other bidders or take such action as it chooses.

M.C.A. reserves the right to reject the tender of any bidder who does not furnish satisfactory evidence of sufficient experience to successfully execute and fully complete the work within the specified time.

11. WORKPLACE SAFETY & INSURANCE BOARD

The Contractor shall, at the time of entering into any contract with the M.C.A., furnish a satisfactory clearance certificate from Workers Safety & Insurance Board (WSIB) stating that all assessment or compensation payable to the WSIB has been paid. Also at any time during the performance and upon completion of such contract, upon request from M.C.A., the Contractor shall furnish a satisfactory clearance certificate from WSIB as outlined above.

12. DELETION FROM CONTRACT

The Mohawk Council of Akwesasne reserves the right to delete up to 20% of the work from the Contract should it be deemed in the interest of the Council to do so without basis for negotiation.

13. WARRANTY PERIOD

The Contractor guarantees and warrants that with ordinary wear and tear the said work shall for a period of **12 months**, unless otherwise specified, from the date of completion as set out in the Certificate of Completion, remain in such condition as will meet with the approval of the Construction Manager and the Engineer, and that he will, upon being required by M.C.A. make good, in a manner satisfactory to the Construction Manager, any imperfections therein due to materials used in the construction thereof or workmanship. The decision of M.C.A. as to the nature, extent and cause of such imperfections and the necessity for remedying the same shall be final.

Should the Contractor fail to comply with the directions of M.C.A., the latter may perform the necessary work after giving the Contractor **twenty-four (24) hours written notice**. In the event of an emergency, of which M.C.A. shall be the sole judge, M.C.A. may forthwith without notice perform the necessary work and the cost of such work in either event may be deducted or collected by M.C.A.

If M.C.A. notifies the Contractor in writing of any imperfections prior to the termination of the guaranteed maintenance period, the Contractor shall make good the imperfections as specified above, notwithstanding that the work of making good may commence after or extend beyond the end of the **12 month** period.

14. FEES FOR CHANGES IN THE WORK

The Sub-contractor performing changes in the work is entitled to 10% to cover both overhead and profit.

Duplication of overhead and profit will not be permitted between subtrades, as occurs, for example, when a plumbing subtrade is in turn a subtrade of the ventilation subtrade, or vice versa. Fees for changes to the work will be paid on actual cost, plus percentages stated above.

15. CONTRACT SIGNING

Sole proprietorship: Signature of sole proprietorship in the presence of witness who will also sign. Insert the words "Sole Proprietorship" under signature, affix seal.

Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" against each signature. Affix seal against each signature.

Limited Company: Signature of all duly authorized signing authorities in their normal signatures. Insert the capacity in which each signing officer acts against each signature. Affix the Corporate Seal.

If the tender is signed by officials other than the President and Secretary of the Company, or the President - Secretary - Treasurer of the Company, a copy of the by-law resolution of the Board of Directors authorizing them to do so must also be submitted with the tender envelope.

If the Contractor/Sub-contractor is a joint venture, each party to the joint venture shall execute the Project seal in the manner appropriate to such party.

16. BRIDGE CROSSING TOLL CHARGE / PASSPORTS

Payment of toll charges or similar fees shall be the responsibility of the Contractor/Sub-contractor /Sub-trades. As of January 2001 toll fees are not applicable when delivering materials or goods destined for Mohawk Council of Akwesasne projects.

It is the contractor's responsibility to comply with the requirements of the Canadian and US Border Agencies, security and goods transportation requirements.

17. EXISTING UTILITIES

Further to the General Conditions of Contract, the following shall apply:

No responsibilities will be assumed by M.C.A. for the correctness or completeness of the plans with respect to the existing utilities, pipes, or other objects. The Contractor shall have no claim on this account. M.C.A. does not ensure the accuracy of such information and the Contractor shall not make any claim against M.C.A. for damages or extra work caused or occasioned by his relying upon such records, reports or information either as a whole or in part.

18. LIQUIDATED DAMAGES

a) Time - Time shall be of the essence of this agreement.

b) Progress of the Work and Time for Completion

The Contractor shall substantially complete this Contract within 60 working days after the date of order to commence work. See Item #23 for Schedule.

If the time period above specified is not sufficient to permit completion of the work by the contractor working a normal number of hours each day or week on a single day light shift basis, it is expected that additional and/or augmented daylight shifts will be required throughout the life of the Contract to the extent deemed necessary by the Contractor to ensure that the work will be completed by the completion date specified. Any additional costs occasioned by compliance with these provisions will be considered to be included in the prices bid for the various items of work and no additional compensation will be allowed therefore.

An extension of time may be granted in writing by the Council in the event of the work being delayed beyond the prescribed date for completion. Such extensions shall be for such time as the Construction Manager may prescribe and the Council shall fix the terms on which the said extension may be granted. An application for an extension of time shall be made in writing by the Contractor to the Construction Manager at least fifteen (15) days prior to the date of completion fixed by the Contract. The Construction Manager will recommend to the Council acceptance or rejection of the request. The date of expiry of all bonds or other surety furnished to the Council by the Contractor, shall be extended at the expense of the Contractor, to at least two (2) months beyond the extended date of completion, and the Contractor shall furnish the Council with evidence of such extension of the bond or other surety.

Any extensions of time that may be granted to the Contractor shall be so granted and accepted without prejudice to any rights of M.C.A. whatsoever under this Contract, and all such rights shall continue in full force and effect after the time limited in this Contract for completion of the work and

whenever in this Contract power or authority is given to M.C.A. or the Construction Manager or any person to take any action consequent upon the act, default, neglect, delay, breach, non-observance or non-performance by the Contractor in respect of the work of contract or any portion thereof.

Such powers or authorities may be exercised from time to time, and not only in the event of the happening of such contingencies before the time limited in this Contract for the completion of the work but also in the event of the same happening after the time so limited in the case of the Contractor being permitted to proceed with the execution of the work under an extension of time granted by M.C.A. In the event of M.C.A. granting an extension of time, time shall continue to be deemed of the essence of this contract.

It is agreed by the Parties to the Contract that in case all the work called for under the Contract is not finished or completed by the completion date as specified above, damage will be sustained by the Council and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the Council will sustain in the event of, and by any reason of, such delay and the parties hereto agree that the Contractor will pay to the Council the sum of **One Thousand Dollars (\$1,000.00)** for each and every **working day** beyond the completion date specified above that the work remains uncompleted and it is agreed that this amount is an estimate of the actual damage to M.C.A. which will accrue during the period in excess of the prescribed completion date.

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

The Contractor shall not be assessed with Liquidated Damages for any delay caused by Acts of God, or of the Public Enemy, Acts of the Province or of a Foreign State, Fire, Flood, Epidemics, Quarantine Restrictions, Embargoes or delays of Subcontractors due to such causes.

If the time required for the completion of the work is increased or decreased by reason of alterations or changes in the work required to be performed under this Contract, the completion date shall be increased or decreased as determined by M.C.A.

The actual completion date shall be the date on which the work is accepted by the Construction Manager and the Engineer.

19. RECORDS

As work progresses, maintain accurate records to show deviations from contract drawings. Supply one set to the Department of Infrastructure, Housing, and the Environment.

20. REVIEW OF SHOP DRAWINGS

The Contractor (or sub-contractor or equipment supplier acting on behalf of the Contractor) shall submit to the Construction Manager in accordance with procedure to be stipulated by the Construction Manager, all shop, working or setting drawings required in order to make clear the work proposed. The Construction Manager will make the submission of the drawings to the Engineer on behalf of the Contractor. The Contractor shall make all changes in such drawings that the Construction Manager or the Engineer may require and resubmit such drawings to the Construction Manager for additional review. Any drawings submitted by the Contractor (or sub-contractor or equipment supplier acting on behalf of the Contractor)

directly to the Engineer, will not be reviewed and will be returned as unacceptable. Any shop drawing not reviewed and stamped by the contractor shall be returned as unacceptable.

When submitting such drawings, the Contractor shall notify the Construction Manager in writing of all respects in which such drawings differ from the requirements of the Contract or from previously notified requirements of the Construction Manager. The Construction Manager's review of such drawings shall not be construed as approval of such differences unless the Contractor has identified all changes and deviations and unless the Construction Manager has specifically approved such differences in writing.

The Construction Manager's and the Engineer's review of such drawings shall not relieve the Contractor from responsibility for the correctness of the drawings or the adequacy of the details shown on the drawings.

Work shall not be carried out before the Engineer's review of the shop and working drawings relating to such work has been completed.

The review pertains to general design only. Errors in dimensioning, quantity or inaccuracies do not relieve the Contractor from responsibility to complete work to the Consultant's satisfaction.

Do not commence manufacture nor order materials before shop drawing and samples are reviewed.

Responsibility for errors, omissions or deviations from requirements of Contract documents is not relieved by the Engineer's review of submittal.

21. OPERATION AND MAINTENANCE MANUALS

Assemble, coordinate, bind and index required data into Operations and Maintenance manuals.

Submit in binder, with identified subsections the following data:

- Maintenance Instruction for finished surfaces and materials
- Copy of hardware and paint finishes
- Written warranties of all materials used
- Written labour warranty

Supplier's names, addresses, and telephone numbers and components supplied by them must be included. All components must contain a description and be identified by manufacturer's part or supply number.

Include one complete set of final shop drawings indicating corrections and changes made during fabrication and installation.

Submit complete Operation and Maintenance manuals to Engineer **two (2) weeks prior** to application for Interim Certificate of Completion of project.

Submit copies in typed English and organize data into some numerical order as contract specifications. Drawings, diagrams and manufacturer's literature must be legible.

Material: Label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.

Binders: Vinyl, hard covered, 3 "D" ring, loose leaf, sized for 215mm x 280mm paper, with spine pockets. Identify contents of each binder on spine.

22. CERTIFICATE OF COMPLETION

1. On the date that the work has been completed, and the Contractor has complied with the contract and all orders and directions made pursuant thereto, (both to the satisfaction of the Construction Manager and the Engineer), the Construction Manager shall issue a Certificate of Completion to the Contractor.
2. If the Construction Manager and the Engineer are satisfied that the work is sufficiently complete to be acceptable for use by the Owner, the Construction Manager may, at any time before issuing a certificate referred to in 1., issue an Interim Certificate of Completion to the Contractor.
3. An Interim Certificate of Completion referred to in 2. shall describe the parts of the work not completed to satisfaction and all things that must be done by the Contractor before a certificate referred to in 1. will be issued.
4. The Construction Manager may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in paragraph two, require the Contractor to rectify any or other parts of the work not completed to his satisfaction.
5. If the contract or a part thereof is subject to a Unit Price Arrangement, the Construction Manager shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor, and shall inform the Contractor of those measurements.
6. The Contractor shall assist and co-operate with the Construction Manager in the performance of their duties (referred to in paragraph 5) and shall be entitled to inspect any record made by the Construction Manager pursuant to 5.
7. After the Construction Manager has issued a Certificate of Completion referred to in 1., he shall, if 5. applies, issue a Certificate of Final Measurement.
 - 7.1 A Certificate of Final Measurement referred to in 7. shall contain the aggregate of all measurement of quantities referred to in 5., and is binding upon and conclusion between the Owner and the Contractor as to the quantities referred to therein.

23. SCHEDULE

The Contractor shall complete of the work within 60 working days. Certain works may be deferred until Spring 2027 if there are unfavorable weather conditions or if supply chain issue result in delays on fencing materials. Any works completed in 2027 will be paid at the tendered price.

FORM OF TENDER

SECTION 2

FORM OF TENDER

Tender by.....
residing at (or place of business)
and
residing at (or place of business)
comprising the firm of.....
.....
a company duly incorporated under the laws of.....
and having its head office at.....
hereinafter called "the tenderer".

NOTE:

The Tenderer's name and residence must be inserted above, and in the case of an incorporated firm, the name and residence of each and every member of the firm must be inserted.

TENDER FOR THE ST. REGIS POLICE STATION SITE UPGRADES PROJECT NO. 24-5090F

TO: Leslie Papineau, OAA, MRAIC, Director
Department of Infrastructure, Housing, and Environment
Mohawk Council of Akwesasne
101 Tewasateni Road
Akwesasne, Ontario K6H 0G5

I (WE)
have carefully examined the locality and site of the proposed works, and all contract documents relating thereto, including: The Form of Agreement, Addendum/Addenda No. to No.* inclusive, Special Provisions, if any, Instructions to Tenderers, inclusive, Supplementary General Conditions, if any; General Conditions, Supplementary Specifications, if any; Specifications, if any, Standard Specifications, if any Contract Drawings, Standard Drawings, Form of Tender, forms of Performance Bond and Labour and Material Payment Bond, hereby tender and offer in accordance therewith to enter into a contract within the prescribed time to construct the said works in strict accordance with the contract schedule, contract documents, and such further detail drawings as may be supplied from time to time and to furnish all materials, labour, tools, plant, matters and things necessary therefore complete and ready for the use within the time specified for the sum of

..... dollars

(\$.....) or such other sum as may be ascertained in accordance with the Contract.

The Tenderer agrees to have the works completed by the time, known as the “Time of Completion”.

THE AFORESAID SUM IS MADE UP AS FOLLOWS:

The Tenderer is required to submit his Tender in accordance with the following Lump Sum Prices for the bulk of the work for the contract along with Unit Prices for additional items. The Engineer may refuse to accept a breakdown containing prices which are, in his opinion, unbalanced and has the right to adjust the breakdown to correct such balancing.

* The Tenderer will insert here the numbers of the Addenda received by him during the tendering period and taken into account by him in preparing his Tender.

TENDER - CLASS A ESTIMATE
MCA - ST. REGIS POLICE STATION SITE UPGRADES
73 SWEETGRASS LANE, ST. REGIS VILLAGE

ITEM No.	SPEC No.	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
1.00 CIVIL WORK						
1.01	31 23 33.01	Earth Excavation (Grading) (150mm thick at existing parking lot and 450mm thick for parking lot extension areas)	m ³ (P)	230		
1.02		Remove, Salvage and relocate Dog Shelter	l.s.	1		
1.03	31 11 00	Removal of Tree	ea (P)	2		
1.04	31 11 00	Clearing and Grubbing - Limbing	m	100		
1.05	02 41 13.13	Removal of Asphalt (Full Depth) including Grinding	m ² (P)	1,205		
1.06	31 23 33.01	Removal of Concrete Pad (Superior Propane)	m ² (P)	7		
1.07	31 23 33.01	Removal of Concrete Sidewalk	m ² (P)	40		
1.08	31 23 33.01	Removal of Curb - All Types	m (P)	134		
1.09	31 23 33.01	Removal of Chain Link Fence (all types)	m	150		
1.10	31 23 33.01	Removal of Sliding Gate including all accessories	l.s.	1		
1.11		Removal of Existing Sign	ea (P)	1		
1.12	33 05 16	Adjust Existing Catch Basin Structures	ea (P)	2		
1.13	32 16 00	Concrete Barrier Curb	m (P)	119		
1.14	32 16 00	Concrete Sidewalk	m ² (P)	40		
1.15		Bollards	ea (P)	5		
1.16	32 11 23	Granular "A" All Inclusive	t	570		
1.17	32 11 16.01	Granular "B" (300mm Depth)	t	75		
1.18	31 32 19.16	Non-Woven Geotextile (Class II)	m2 (P)	95		
1.19	32 31 13	Chain Link Fence (2.1m Height completed with concrete encased post)	m (P)	127		
1.20		Double Wall HDPE Privacy Slats for Fencing	m (P)	127		
1.21	32 31 13	Chain Link Fence (1.8m Height completed concrete encased post)	m (P)	7.5		

1.22	32 31 13	New 3m Wide Single Swing Gate (for propane tanks enclosure)	ea (P)	1		
1.23	32 31 13	New 6m Wide Double Swing Gate (Snow Removal)	ea (P)	1		
1.24	32 31 13	New 5m Wide Vertical Pivot Gate complete with concrete pad	ea (P)	1		
1.25	11 12 00	Detector loop conductor cable and loop feeder cable in paved surface	m	20		
1.26		Tactile Walking Surface Indicators (per set) per OPSD 310.039	ea (P)	2		
1.27	32 12 16.01	Road Surface Course 40mm Depth - HL3	t	140		
1.28	32 12 16.01	Road Binder Course 50mm Depth - HL 8	t	175		
1.29	32 17 23	Pavement Markings and Symbols	l.s.	1		
1.30	32 91 19.13	Topsoil - Imported (100mm Depth)	m ³ (P)	25		
1.31	31 91 19.16	Hydraulic Seeding	m ² (P)	250		
SPI - Special Provisional Item, PROV - Provisional Item, (P) - Plan Quantity						
1.00 - SUBTOTAL						

ITEM No.	SPEC No.	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
2.00 ELECTRICAL WORK						
2.01	11 12 00	New 5m Wide Pivot Gate Including Connections not covered in other items	l.s.	1		
2.02	31 23 33.01	Removal of Electrical Equipment and Materials	l.s.	1		
2.03	26 05 43.01	Wiring for Controls, Power and Grounding for Swing Gate and Pedestals	l.s.	1		
2.04	26 05 00	Connect traffic gate power supply to existing panel	ea	1		
2.05	11 12 00 / 28 13 00	Supply and Install new Controllers including: pole Foundation, pole, push button intercom, camera, card reader and associated works	ea	2		
2.06	33 65 76	Supply and install 2 - 53mm duct bank (Security)	m	50		
2.07	33 65 76	Supply and install 1 - 53mm duct bank (Power)	m	20		
2.08	01 73 00	Building concrete cores for connection of power, controls and spare ducting into electrical room and for connection to security desk	l.s.	1		

FORM OF TENDER

2.09	01 79 00 / 01 91 00	Testing and Commissioning of gate and communications	l.s.	1		
SPI - Special Provisional Item, PROV - Provisional Item, (P) - Plan Quantity						
2.00 - SUBTOTAL						

ITEM No.	SPEC No.	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
3.00	GENERAL ITEMS					
3.01	01 00 10	Mobilization and Demobilization	l.s.	1		
3.02	GC	Pre-Condition Contractor Survey	l.s.	1		
3.03	GC	Environmental Protection	l.s.	1		
3.04	GC	Traffic Control Plan	l.s.	1		
3.05	GC	Pedestrian Control Plan	l.s.	1		
3.06	GC	Post-Costruction Survey / As-builts	l.s.	1		
3.07	32 15 60	Calcium chloride Flake	kg	200		
3.08	GC	Contingency	l.s.	1	\$25,000.00	\$25,000.00
SPI - Special Provisional Item, PROV - Provisional Item, (P) - Plan Quantity						
3.00 - SUBTOTAL						

TENDER - CLASS A ESTIMATE

MCA - ST. REGIS POLICE STATION SITE UPGRADES

SUMMARY

SECTION	DESCRIPTION	TOTAL AMOUNT
1.00	CIVIL WORK	
2.00	ELECTRICAL WORK	
3.00	GENERAL ITEMS	
TOTAL AMOUNT (excl. HST)		

STATUTORY DECLARATION:

CANADA
PROVINCE OF QUEBEC / ONTARIO

(IN THE MATTER of a Proposed Contract for the
(ST. REGIS POLICE STATION SITE UPGRADES
PROJECT

COUNTY OF _____

TO WIT:

_____ **DO SOLEMNLY SWEAR THAT** the several matters
stated in the foregoing Tender are in all respects true, **AND** _____ make this solemn
declaration, strictly believing it is to be true, and knowing that it is of the same force and effect as if made under oath,
and by virtue of “The Canada Evidence Act”.

DECLARED before me

the.....)
.....)
of)
In the County of)
This day of 2026)

.....
Tenderer

The General Conditions for this project requires that the Tenderer completes and submits this declaration with this tender. Failure to complete the Statutory Declaration may result in the tender being invalidated by Mohawk Council of Akwesasne.

STANDARD TENDER REQUIREMENTS

Period of Validity of Tender

Extra lump sum to extend the period of validity of tender from 60 days to 120 days from the date of submission = \$..... (Refer to Instructions to Tenderers - Liquidated Damages).

The aforementioned lump sum shall apply regardless of any difference between the Final Contract Price and the Original Contract Price.

M.C.A. may in its discretion take into account the extra lump sum tendered above when comparing tenders for awarding a contract.

If this tender is accepted by M.C.A., the Tenderer agrees:

1. To 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;
2. To carry out of any work referred to in Paragraph (1) above or the issuance by the Engineer of a Contract Change Order relating to such work or the acceptance 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 Council or of the Engineer under the Contract;
3. To pay M.C.A. the sum specified in the Contract (as liquidated damages) for each calendar day that the work under the Contract as modified by all Contract Change Orders issued by the Engineer remains uncompleted after the expiry of the Time of Completion specified in the contract or the extended time for completion allowed in writing by the Engineer. See Instructions to Tenderers, Item No. 18.

The prices applicable to work referred to in Paragraph (1) above shall be determined as follows:

- a) The Schedule of Items and Prices shall apply where applicable;
- b) If the above Schedule is inapplicable the prices shall be determined in accordance with Section 26 of the General Conditions.

The Tenderer agrees that, if so requested in writing by M.C.A., he will enter into a contract with M.C.A. based upon his tender but jointly in the names of the Tenderer and the Tenderer's parent company, if any. The Tenderer further agrees that any request by M.C.A. as indicated above is not and shall not be deemed to be a counteroffer by M.C.A.

STANDARD TENDER REQUIREMENTS (Cont'd)

The Tenderer further declares:

This tender is subject to a formally prepared and executed contract.

This tender is made without any connection, comparison of figures or arrangements with, or knowledge of, any other corporation, firm or person making a tender for the same work and is in all respects fair and without collusion or fraud.

No member of the Mohawk Council and no officer or employee of the Council or of the Engineer is or will become interested directly or indirectly as a contracting party, partner, surety or otherwise, or in the performance of the Contract or in the supplies, work or business to which it relates.

On request, the Tenderer agrees that he will furnish to M.C.A. a copy of his latest financial statement within four (4) days after being requested to do so by M.C.A.

EVALUATION OF TENDERERS

Evaluation of Qualified Tenders

Qualified Tenders will be, at the discretion of the Mohawk Council of Akwesasne, evaluated by the Evaluation Team. The Tenderer is reminded that the lowest bid price will not necessarily be accepted and that the MCA reserves the right to reject any or all tenders.

The following criteria and weighting will be used in the evaluation of qualified tenders:

#	Criterion	Description	Weighting
1.	Total Bid Price	The total bid price as declared in the Form of Tender.	50%
2.	Native Content	The value of local Native labour, equipment, operators, and construction materials as declared in the Form of Tender.	25%
3.	Joint Venture	The bidder has formed a joint venture partnership with a local Native contractor for the purpose of undertaking the project.	15%
4.	Previous Experience	The bidder has several years of experience in work of a similar scope and complexity.	10%

QUALIFICATIONS OF SUB-CONTRACTORS

The Tenderer must list on this statement sheet the name of each proposed sub-contractor for the Tenderer's convenience and to ensure that a complete list is submitted with the Tender.

The Tenderer shall make an entry against each possible sub-trade listed whether by naming the proposed sub-trades or by entering "by own forces", whichever applies. No blank spaces shall be left.

In addition, if the Tenderer proposes to sublet a part of the work he shall add the sub-trade and the proposed sub-contractor's name to the following list:

FAILURE TO COMPLY WITH THE AFOREMENTIONED REQUIREMENTS MAY RESULT IN THE TENDER BEING DISQUALIFIED BY MCA.

MAJOR ITEM

SUB-CONTRACTOR

Fencing

Concrete Works

Paving

The contractor shall not, without written consent of the Owner, change a subcontractor who has been proposed above.

**CONSTRUCTION SUPERVISOR
EXPERIENCE REQUIREMENT**

Site Supervisor Experience Requirement

The tenderer will designate a proposed construction supervisor who will coordinate contractor activity full time on site for the duration of the project.

Substitution will not be allowed without the prior written approval of the MCA Department of Technical Services Director.

The designated construction supervisor must have a minimum of ten (10) years experience in municipal infrastructure projects of a similar size and scope.

The tenderer will attach as part of their tender, a curricula vitae for the proposed construction supervisor outlining his or her experience in municipal infrastructure projects of a similar size and scope.

It is to be noted that the experience of the designated construction supervisor forms part of the contract documents and will form part of the basis of evaluation and recommendation for award of contract.

Should the tenderer not be able to provide a designated construction supervisor with acceptable experience the MCA will have the option of disqualifying the tender.

The tenderer hereby appoints _____ as designated construction supervisor (curricula vitae attached hereto).

Contractor

Date

STANDARD TENDER REQUIREMENTS
(AGREEMENT TO BOND)

The "Agreement to Bond" of the, a company lawfully doing business in the Provinces of Ontario or Quebec, to furnish a Performance Bond and a Labour and Material Payment Bond each in an amount equal to 100% of the Contract price, or in such greater amount as may be required by the Council, if this tender is accepted, is enclosed herewith.

The Tenderer agrees that M.C.A. reserves the right to reject any or all tenders and that the lowest or any tender will not necessarily be accepted. M.C.A. reserves the right to award the contract to an otherwise qualified local bidder if the local bidder's price is within five percent of the lowest total tender price.

A certified cheque in an amount equal to 10% of the total tender price to a maximum of \$20,000.00 applicable to First Nation contractors only, or a Bid Bond for 10% of the Tender amount payable to M.C.A. is attached hereto as the required tender deposit.

If the successful bidder fails to enter into a contract with the Council of Akwesasne:

- where a certified cheque was provided for bid surety the cheque will be cashed and the funds used to make up the difference between the low bid and the next acceptable bid up to the value of the cheque. Unused funds will be returned to the issuer.
- ★ where a Bid Bond was provided for bid surety, the Bonding Company will make up the difference between the low bid and the next acceptable bid up to the value of the bond.

Dated atthis day of, 2026

.....
Signature of Witness

.....
Signature of Tenderer

NOTE: If the tender is submitted by, or on behalf of, a corporation, it must be signed in the name of such corporation by the duly authorized officers and the seal of the corporation, or wafer seal, must be affixed. If the tender is submitted by, or in behalf of, an individual or a partnership, a seal must be affixed opposite the signature of the individual or of each partner and each signature must be witnessed.

AGREEMENT TO BOND

**
**
**
**
Date, 2026

Mohawk Council of Akwesasne
Department of Technical Services
101 Tewasateni Road
Akwesasne, Ontario
K6H 0G5

Dear Sirs:

**Re: St. Regis Police Station Site Upgrades Project
Project No. 24-5090F**

In Consideration of the Mohawk Council of Akwesasne (hereinafter referred to as "the Owner") accepting the tender of and executing an Agreement with: (hereinafter referred to as "the Tenderer") for the construction of: St. Regis Police Station Site Upgrades Project subject to the express conditions that the Owner receive the Performance Bond and the Labour and Materials Payment Bond in accordance with the said tender, we the undersigned hereby agree with the Owner to become bound to the Owner as surety for the Tenderer in a Performance Bond and a Labour and Material Payment Bond each in an amount equal to 100% of the contract price or other such great amount as may be determined by the Owner, in the forms of Performance Bond and Labour and Material Payment Bond and in accordance with the said tender, and we agree to furnish the Owner with said tender, and we agree to furnish the Owner with the said Bonds within seven (7) days after notification of the acceptance of the said Agreement by the Owner has been mailed to us.

Yours very truly,

(Corporate Seal)

.....

NOTE: This Agreement to Bond must be executed on behalf of the Surety Company by its authorization officers under the Company's corporate seal. Of the two forms bound herein, one shall become a part of the tender and the other shall be retained by the Surety Company.

** Enter the name and address of the Surety company at the top of the page

GENERAL CONDITIONS

SECTION 3

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1.0 DEFINITIONS

Wherever used in these General Conditions, Special Conditions, Plans, Form of Tender, Instructions for Tenderers, Specifications, Statutory Declarations or other documents forming part of this Contract:

"authorized", "directed", "required", "requested", "approved", "ordered", "sanctioned", "considered" and "satisfactory", shall, unless some other meaning is obvious from the context, mean respectively authorized, directed, required, requested, approved, ordered, sanctioned or considered by or satisfactory to the Consulting Engineer.

"Owner" means the Mohawk Council of Akwesasne.

"Contract" includes the Agreement to do the work entered into with the Owner, the Specifications, the General Conditions, Special Conditions, Information for Tenderers, the Plans, the Tender and all other documents referred to in or bound with the said Agreement and identified as being part of the contract documents.

"Contractor" or a pronoun in place thereof, means the person or persons or corporation who have undertaken to carry out the Contract.

"Construction Manager / Contract Administrator" means the firm or individual designated by the Owner to tender and manage all contracts for this project.

"Consulting Engineer" means the Consulting Engineer named in the Form of Quotation, or such other person, Firm or Corporation designated by the Owner.

"Site Representative" means a site representative for the Owner acting under the direction of the Consulting Engineer.

"Owner" has its natural meaning except when it refers to the Owner of the project.

"period of maintenance" means the period from the date of substantial performance of the contract, as set out in the Certificate of Substantial Performance, to the date of issuance of the Final Certificate and shall be not less than 12 months.

"Plans" means all plans, profiles, drawings, sketches, or copies thereof exhibited, used or prepared for or in connection with the work embraced under the Contract.

"plant" (unless the context requires a different meaning) means every temporary or accessory means necessary or required to carry on or complete the work and extra work, in the time and manner herein provided.

"shall", "may", "herein", "person", "writing" or "written", "surety", and "security" and words used in the singular number of the masculine gender, shall have the meaning and effect as given in the Interpretation Act of the Revised Statutes of Ontario.

"Solicitor" means the person for the time being acting as Solicitor for the Owner.

"Subcontractor" includes only a person, firm or corporation having a contract for the execution of a part or parts of the work included in the contract with the Owner, or a person, firm or corporation furnishing material called for in the contract with the Owner and worked to a special design according to the plans or specifications, but does not include one who merely furnishes material not so worked.

"work" or "works" (unless the context requires a different meaning) means the whole works, materials, matters and things required to be done, supplied, or installed that are mentioned or referred to in the Contract, including all extra or additional work or material, matters or things which may be ordered by the Consulting Engineer, as herein provided.

“Working Day” means any Day

- (a) except Saturdays, Sundays and statutory holidays;
- (b) except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom, from proceeding with a Controlling Operation. For the purposes of this definition, this will be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and equipment force effectively engaged on the Controlling Operation for at least 5 hours;
- (c) except a Day on which the Contractor is prevented from proceeding with the Controlling Operation, as determined by the Contract Administrator by reason of:
 - (1) any breach of Contract or prevention by the Owner, by any other Contractor of the Owner or by any employee of any one of them,
 - (2) non-delivery of Owner supplied materials;
 - (3) any cause beyond the reasonable control of the Contractor which can be substantiated by the Contractor to the satisfaction of the Contract Administrator.
- (d) Working days will not be charged during the period December 15th to May 15th inclusive, unless the Contractor opts to complete contract works during this period.

2.0 TENDERS

All tenders for the execution of the work herein set forth or referred to must be made on the printed forms supplied for that purpose. No others will be considered. Such tenders must be made without any knowledge, comparisons of figures or arrangements with any other person making any tender or estimate for the same purpose, and the tenderers shall declare that such tenders are in all respects fair and without collusion or fraud, and that no employee of the Owner is, shall be, or shall become interested, directly or indirectly, as contracting party, partner, surety or otherwise in, or in the performance of, the Contract, or in the supplies, work or business to which it relates, or in any portion of the profits to be used therein or thereof, or in any of the monies to be derived therefrom. The tender must be verified by the Statutory Declaration of the party or parties making the tender that the several matters stated therein are in all respects true. Tenders must cover the cost of completion of the Contract in every respect, in accordance with the Contract, including all labour, plant, tools, etc.

The Contractor agrees that he is fully informed regarding all of the conditions, local or otherwise, affecting the work to be performed and that his information was secured by personal investigation and that he will make no claim against the Owner based on any estimate or representation of the Owner or of any representative of same.

3.0 SCOPE OF CONTRACT

Stated in general terms, and without in any way limiting the requirements and intent of the Contract, the works required to be done by the Contractor under the Contract comprises construction, completion and maintenance of the works referred to in the Plans, Specifications, General Conditions or other contract documents relating thereto and includes the provision, except where otherwise specifically stated in the Contract, of all labour, plant, materials and equipment required for the complete and proper execution of the work. The contract documents are complementary and what is required by any part thereof shall be considered as being required by the whole thereof. Materials and work which are not specifically described or shown in the contract documents but the necessity of which can reasonably be considered as inferable from the contract documents shall be supplied and performed by the Contractor at no additional cost to the Owner and the Contractor shall not claim extra payment therefore or an extension of the time for completion on account thereof.

In the case of discrepancies between drawings, those of larger scale, or if the scales are the same, those of later date shall govern.

4.0 PLANT, LABOUR AND MATERIAL

The Contractor shall provide all necessary skilled and unskilled labour, and materials, fuel, machinery, tools and all plant, so that the Contract, and all work required to be done under it, can and will be carried on continuously and expeditiously to completion, in all respects to the satisfaction of the Construction Manager and the Consulting Engineer.

All material, plant, machinery, tools and equipment acquired, possessed or provided by the Contractor for incorporation into the works shall be the property of the Owner, whether or not such material, plant, machinery, tools and equipment are brought to or upon the works or upon lands of the Akwesasne Territory and the Contractor is prohibited from removing or disposing of the same, or any part thereof, without the consent or instructions of the Consulting Engineer in writing.

No materials, plant, machinery or equipment reasonably required for the performance of the Contract and not for incorporation into the works, brought to or upon the works or upon lands of the Akwesasne Territory, shall be removed or disposed of during the progress of the works without the written consent or instruction of the Construction Manager or his authorized representative. In case of a difference of opinion between the Contractor and the Construction Manager or his authorized representative as to whether any of the aforesaid items is reasonably required on the works for the satisfactory progress of the works, the Contractor shall abide by the decision of the Consulting Engineer.

5.0 SAMPLES

Before any material of any kind is used on the work, the Contractor shall submit samples thereof for the approval of both the Construction Manager and the Consulting Engineer and must obtain such approval. No material shall be used on the work which is in any inferior to the approved samples. The giving of such approval shall not obligate the Owner to pay for any material other than in accordance with the Contract, shall not prevent the rejection of any material which may be found, in the opinion of the Construction Manager or the Consulting Engineer, to be unsound or unfit for use on the work or not in accordance with the approved samples or the requirements of the Contract and shall not be deemed to be a waiver of objection to the work or any part thereof at any time on account of the materials used not being satisfactory or on any other account. The decision of the Consulting Engineer with respect to the approval or rejection of samples shall be final.

6.0 CONDEMNED AND SURPLUS MATERIALS

Should any plant, appliances or materials which the Construction Manager or the Consulting Engineer may deem to be inferior or unfit for use in or on the works, be brought on the ground, or used, the same shall be wholly removed therefrom within twenty-four (24) hours after notification to that effect from the Construction Manager, and in case of failure or neglect on the part of the Contractor to remove the same, the Construction Manager may cause the same to be taken away at the Contractor's expense and deposited, wasted, or otherwise disposed of, in any locality, place or way he considers convenient or proper, and the Contractor shall forthwith pay to the Owner on demand, all expenses incurred, including storage, if any, or the same may be deducted or collected by the Owner, as provided in the section hereof entitled "Monies Due Owner".

No surplus or other material of any kind, arising from any portion of the work, shall be sold, thrown away, dumped, wasted, or otherwise disposed of without the written sanction of the Construction Manager, and if so disposed of the Construction Manager may ascertain as nearly as he conveniently can the quantities and value, and deduct the same from the Contractor's next progress payment certificate.

Surplus materials are to be offered to adjacent property owners. If the property owner wants the fill, then Contractor is to place and level fill to a height of not more than 2m.

7.0 EQUIVALENTS

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 Specifications.** After the acceptance of a tender, the Contractor may apply to the Construction Manager, who will apply on behalf of the Contractor to the Consulting 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 aforesaid and such other information as the Consulting Engineer may require.

8.0 APPROVALS AND PERMITS

The construction of the works and all operations connected therewith are subject to the approval, inspection, by-laws and regulations of Owner, provincial and federal and other authorities having jurisdiction in respect to any matter embraced in this Contract. The Contractor will obtain and pay fees, if any, for approvals and permits, unless otherwise specifically stated in the tender documents.

9.0 ERRORS AND OMISSIONS BY CONTRACTOR

Errors, mistakes, omissions or unauthorized changes made by the Contractor or his agents, workmen or employees and all damage and delay costs that may result therefrom shall be rectified and paid for by the Contractor at his own expense.

10.0 DELAYS

If, after the execution of the Contract, the Contractor suffers damage by reason of delay with respect to construction of the works arising from causes other than adverse weather or labour disputes and beyond his control, the Owner may in its discretion compensate the Contractor wholly or in part for such damage.

The Contractor shall take all steps necessary or advisable to reduce or eliminate all damage or loss by reason of delay with respect to construction of the works arising from any cause whatsoever.

11.0 ORAL ARRANGEMENTS

In all cases of misunderstandings or disputes, oral arrangements will not be considered, but the Contractor must produce written authority in support of his contentions, and shall advance no claim in the absence of such written authority, and shall not use, or attempt to use, against the Owner any conversation with any parties.

12.0 DECISIONS BY THE CONSULTING ENGINEER

Should any discrepancies appear or differences of opinion or misunderstanding arise as to the meaning of the Contract or as to any omissions therefrom or statements therein in any respect, or as to the quality or dimensions or sufficiency of the materials, plant or work or any part thereof, or as to the due and proper execution of the works, or as to the measurement or quantity or evaluation of any works executed or to be executed under this Contract, or as to extras thereto or deductions therefrom, or as to any other questions or matters arising out of the Contract, the same shall, subject to the terms of the Contract, be determined by the Consulting Engineer, who shall have the right at all reasonable times to visit, enter and carry out site reviews at any buildings, factories, workshops, works or sites of the Contractor or others wherever any materials are being prepared, manufactured or treated, or other work is being done in connection with this Contract and the right also to take such samples therefrom as he may deem necessary and the Contractor shall immediately when ordered by the Consulting Engineer, proceed with and execute the work or works, or any part thereof, forthwith in accordance with such order and with such additions to or deductions from the contract price as are provided under the terms of the Contract, without making any claim for any extension of time in completing the work, unless arranged in writing with the Construction Manager as herein provided.

13.0 SITE REPRESENTATIVE AND SITE REVIEW

All work to be done under the Contract shall be done to the satisfaction of the Construction Manager and the Consulting Engineer or of an agent or Site Representative authorized by the Construction Manager to act for him. The Site Representative is required by the Consulting Engineer to see that the provisions of the Contract are faithfully adhered to, especially as regards to the quality of the workmanship and materials, and may stop the work entirely if there is not a sufficient quantity of suitable and approved material on the site to carry on the work properly or for any good and sufficient reason. In particular, but without limiting the powers of the Site Representative, orders given by the Site Representative relating to the quality of material or workmanship or in respect of safety or public convenience must at once be obeyed by the Contractor. The Site Representative shall have the power to suspend any worker for incompetency, drunkenness, negligence or disregard of orders and the Contractor shall ensure that any worker so suspended is forthwith removed from the site.

14.0 OCCUPANCY OF THE WORKS

The use or occupancy of the works or any part thereof by the Owner shall not be taken in any manner as an acceptance by the Owner of any work of material not in accordance with the Contract or to relieve the Contractor or his surety from liability, whether heretofore or hereafter incurred or arising, in respect of the observance or performance of any covenant or condition in the Contract not then performed, whether such covenant or condition be by way of indemnity to the Owner or otherwise, save to the extent that loss or damage is caused during such use or occupancy by the Owner or by employees of the Owner for whom the Owner is responsible. In particular, without limiting the generality of the foregoing, the use or occupancy of the work or any part thereof by the Owner shall not release the Contractor from liability to pay to the Owner,

or waive or impair the right of the Owner to deduct and retain, liquidated damages and resident engineers' and inspectors' fees, in accordance with the Contract.

15.0 ABSENCE OF CONSTRUCTION MANAGER AND CONSULTING ENGINEER AND HIS AGENT

The Owner may appoint a Construction Manager or a Firm of Construction Management, Consulting Engineer or Firm of Consulting Engineers as agents of the Consulting Engineer for the purpose of reviewing the work performed under this Contract. In the absence of the Consulting Engineer or his duly appointed agent, any inspector who has been designated by the agent to review the work shall have full power to decide as to the manner of conducting and executing the work in every particular and the Contractor shall follow the instructions or orders of the person so designated.

16.0 CONTRACTOR'S ABSENCE

In the absence of the Contractor from the works (whether permanent or temporary) he must provide and leave a competent and reliable superintendent in charge of the entire works for him at all times, notwithstanding the extent of subletting, and such person shall be considered as acting in his place, and all notices, communications, orders or instructions given or sent to or served upon such person shall be taken as served upon and received by the Contractor.

17.0 CONVENIENCES

The Contractor shall provide, and properly maintain in clean condition, suitable and convenient privy or water closet accommodation for the benefit of all Contractors.

18.0 PUBLIC CONVENIENCE AND SAFETY

If at any time the Construction Manager or his authorized representative considers the works to be unsafe he may order the Contractor to take measure forthwith to ensure adequate safety. Should the Contractor fail to take adequate measures, the Construction Manager or his representative may order the work to cease until such measures have been taken. The Contractor shall not be entitled to additional payment for, or an extension of time for the performance of the Contract by reason of, such safety measures. The fact that the Construction Manager or his representative has ordered or has failed to order additional safety measures shall not relieve the Contractor of responsibility for the adequacy of the safety measures taken.

19.0 LOSS OR DAMAGE

The Owner shall not in any manner be answerable or accountable for any loss or damage by fire or otherwise that shall or may happen to the work or any part or parts thereof; or for any of the materials or other things used and employed in finishing and completing the work, or for any injury to any person or persons, including workmen and the public, or for damage to adjoining property, against all of which injuries and damages to persons or property, the Contractor shall properly guard, and shall make good all damage of whatsoever nature or origin which may arise out of, or be occasioned by any cause connected with the Contract, or the work done by the Contractor, and shall indemnify and keep indemnified the Owner against same until the completion of all the work hereunder and the termination in accordance with the Contract of the insurance which the Contractor is required by the Contract to provide.

20.0 INSURANCE

- (a) The Contractor shall insure and shall maintain insurance for, in the joint names of the Contractor, the Construction Manager, the Consulting Engineer, the Geotechnical sub-consultant and of the Owner, and in an insurance company satisfactory to the Owner, the work and all the material, plant, fuel, machinery, tools and equipment are brought to or upon the work or upon lands of the Owner, in an amount not less than 100% of the total value of such work and material, plant, fuel, machinery, tools and equipment and such additional amount, not exceeding the contract price, as may be directed by the Owner, against all risk, so that any loss under such insurance shall be payable to the Owner and the Contractor as their respective interests may appear. The Contractor shall deposit with the Owner a cover note of such insurance in the form attached hereto and the original policy of such insurance in the form attached hereto and the original policy of such insurance or a Certificate of Insurance, clearly stating that the policy of insurance provided as aforesaid complies with these provisions. The Contractor shall pay all insurance premiums as they become due; provided that the Owner may pay the premiums and deduct the amount thereof from monies due the Contractor. Any loss or damage which may occur shall not affect the rights and obligations of the Contractor or of the Owner under this Contract except that in such event the Construction Manager may in writing extend the time for completion for such period as he thinks reasonable. If the Construction Manager does not extend the time for completion, then the work must be completed within the time fixed in the Contract. Monies paid to the Contractor under such insurance shall be used for the purpose of replacing, rebuilding, repairing and completing the work, and all such material, plant, fuel, machinery, tools and equipment which have been damaged or destroyed. Such replacing, rebuilding, repairing and completion shall be carried out in every way subject to the terms and conditions of the Contract.
- (b) The Contractor shall maintain and pay for such insurance and shall pay such assessments as will protect him from claims under the Worker's Compensation Act and from any other claims for damages arising from bodily injury, including death, and from claims for property damage which may arise from his operations under this Contract. The Contractor shall deposit with the Owner a Certificate of such insurance, in the form attached hereto, clearly stating that the policy of insurance so provided complies with these provisions.
- (c) The insurance required under paragraphs (a) and (b) shall be maintained in full force until the Construction Manager has issued a Certificate of Completion or until the Owner has otherwise approved in writing save that if the Contractor continues to work at the site after the date of completion as established by the Certificate of Completion or returns to the site to work after such date, he shall maintain or renew for the duration of such work the Insurance required by the Contract.

21.0 CONTRACTOR'S LIABILITY

The Contractor shall assume the defence of and indemnify and save harmless the Owner and its officers and agents from all claims relating to labour and materials furnished for the work, and to inventions, copyrights, trademarks, royalties or patents, and rights thereto, relating to or used in doing the work, or the subsequent use and operation of the work or any part thereof upon completion. In carrying out the works from their inception, and until the final acceptance of the same, the Contractor must be careful to cause as little injury or damage as possible to any adjacent property, public or private, or to any sidewalks, roadways, curbs, gutters, drains, hydrants, manholes, frames, covers or street gullies, boulevards, grass plots, sodding, trees, shrubs, or structures, works or things on or near the line or in the vicinity of the works or elsewhere, and, except as in this Contract is otherwise provided, if injury or damage is done, he must make good the same, at his own expense, in the manner directed by, and to the satisfaction of, the Construction Manager. The Contractor shall be responsible for any and all damages, or claims for damages for injury or accidents done or caused by him or his employees or agents, or resulting from the prosecution of the works, or any of his operations, or caused by reason of the existence or location or condition of the works, or of any materials, plant or machinery used

thereon or therein, or which may happen by reason thereof, or arising from any act of commission or omission on his part, or on the part of any of his agents or employees, in connection with the Contract, and covenants and agrees to hold the Owner harmless and indemnified from all such damages and claims for damage; and in case of the Contractor's failure, neglect or omission to observe and perform faithfully and strictly, all the provisions of the Contract, the Construction Manager may, either with or without notice (except where in this Contract, notice is specially provided for, and then upon giving the notice therein provided for), take such steps, procure such material, plant, trucks and men, and do such work or things as he may deem advisable toward carrying out and enforcing the same, and any and all expenses so incurred may be deducted or collected by the Owner under the provisions of Section 34 hereof, entitled "Monies Due Owner", and any such action by the Construction Manager as he is herein empowered to take, shall not in any way relieve the Contractor or his surety from any liability under the Contract.

22.0 NIGHT, SUNDAY AND HOLIDAY WORK

The Construction Manager may order the work to proceed on a two or three eight-hour shift basis if he deems this necessary to speed up the work, or he may order any work to be carried out in whole or in part at night, and the Contractor shall have no claim for extra compensation in respect thereof. No work, however, shall be undertaken at night without the consent in writing of the Construction Manager.

Whenever, in the judgment of the Consulting Engineer, it may be necessary or expedient to do work at night or after or before the regular time of ending or beginning labour, such night or overtime work shall be performed by the Contractor without additional or extra cost to the Owner beyond the price bid for the work.

23.0 NOTICE TO CONTRACTOR

Any notice or communication to the Contractor shall be deemed to be well and sufficiently given and served if handed to the Contractor or any of his clerks or agents, or if posted or sent to the address given in the Agreement, or to his domicile or usual place of business, or to the place where the work is to be or is being carried on, or if posted to or left at his last known address, and any papers so left, sent or addressed shall be considered to be, and to have been legally served upon the Contractor.

24.0 RELEASE OF HOLDBACK TO SUBCONTRACTORS

Notwithstanding that the Contract as a whole has not yet been substantially performed, the Construction Manager may, if requested in writing by the Contractor, approve the completion of a Subcontract and the release to a Subcontractor through the Contractor of the 10% holdback retained by the Owner in respect of the work covered by the said Subcontract provided that:

- (a) the Contractor certifies:
 - (1) that the said Subcontract has been completed satisfactorily, or
 - (2) that the said Subcontract has been completed satisfactorily except for work not exceeding in value the lesser of
 - (i) one percent of the Subcontract Price, and
 - (ii) \$1,000.00and gives reasons why the uncompleted work is still outstanding.
- (b) the Construction Manager is satisfied:
 - (1) that the said Subcontract has been completed satisfactorily, or

- (2) that the said Subcontract has been completed satisfactorily to the fullest extent reasonably possible at that date and that the work remaining to be completed does not exceed in value the sum derived from (a)(2) above.
 - (3) that all required or necessary inspection and testing of the works covered by the said Subcontract have been carried out and that the results are satisfactory.
- (c) the Contractor has furnished to the Construction Manager:
 - (1) a release by the Contractor in a form satisfactory to the Construction Manager releasing the Owner from all further claims (excepting holdback monies) relating to the said Subcontract.
 - (2) evidence satisfactory to the Construction Manager that the said Subcontractor has discharged all liabilities incurred by him in carrying out the said Subcontract and that all liens in respect of the completed Subcontract have expired or have been satisfied, discharged or provided for by payment into Court.
 - (3) a satisfactory clearance certificate or letter from the Worker's Compensation Board relating to the said Subcontractor.
 - (4) the required maintenance security in respect of the said Subcontract as provided in Section 39 hereof.
 - (5) as-built drawings and maintenance manuals approved by Construction Manager, Consulting Engineers and accepted as satisfactory by the Owner.
- (d) The Consulting Engineer has completed a review of the facilities and is satisfied.
- (e) the Construction Manager retains sufficient money to cover the cost of completing any work which remains uncompleted under the said Subcontract.

The Construction Manager shall, within seven days after he approves a certificate wherein it is certified that the Subcontract has been completed, give a copy of the said certificate to the Contractor and to the Subcontractor concerned.

On receipt of the holdback monies from the Owner, the Contractor shall forthwith pass to the Subcontractor concerned the payment due under the said Subcontract and shall pass to the Construction Manager a copy of the transmittal letter showing the amount of the said payment.

The period of maintenance for the work carried out under the said Subcontract shall continue until the issuance of the Final Certificate for the Contract.

Release of holdback monies by the Owner in respect of a Subcontract in accordance with the foregoing shall not relieve the Contractor or his surety of any of their responsibilities and shall not be made until a period of 45 days has elapsed from the date of approval of the certificate certifying the said Subcontract to be completed.

25.0 MEASUREMENTS

- (a) Approximate monthly accounts of the works completed under the Contract shall be made by the Construction Manager at the end of each calendar month except where the work has been delayed or suspended. An authorized representative of the Contractor shall assist the Construction Manager in taking such measurements and shall furnish all particulars required by the Construction Manager. The Construction Manager shall notify the Contractor when such a measurement will be made.

- (b) The said monthly accounts shall not bind the Construction Manager in any manner in the preparation of his final account of the works constructed by the Contractor under this Contract, but shall be construed and held to be approximate only.
- (c) The final measurement shall be prepared in detail as soon as the whole of the works have been completed, and this final measurement shall be approved and accepted in writing by the Construction Manager. Thereafter the Completion Payment Certificate shall be issued and payment shall be made in accordance with Section 39 hereof.

26.0 VALUATION OF VARIATIONS

- (a) The Construction Manager shall determine the amount, if any, to be added to, or deducted from, the sum named in the Tender, in respect of any extra or additional work done, or work omitted by his order. All such work shall be valued at the price as set out in the Schedule of Items and Prices or the Schedule of Additional Unit Prices if, in the opinion of the Consulting Engineer, the same shall be applicable.
- (b) If the Contract does not contain any prices applicable to the extra, additional, or omitted work, then the Contractor and Construction Manager may agree on a price for such work, in which case the price shall be comparable to prices quoted on work of a similar nature.

27.0 BOOKS AND RECORDS OF THE CONTRACTOR

- (a) The Contractor shall keep proper books and records showing names, trades, and addresses of all workers in his employ and wages paid to, and the time worked by, such workers; also records, books, and invoices showing all costs, expenditures, payments, settlements, receipts, and balances in connection with the construction of the works.
- (b) All records of the Contractor relevant to the valuation of the works including payrolls, time books of account, invoices, and statements, shall be maintained on the site or at some other place approved by the Construction Manager and shall be open at all reasonable times for review by the Construction Manager. The Contractor shall in every way assist such review for the purpose of establishing and determining labour costs, the cost of extra work, and progress payments to be made.

28.0 PAYMENT

- (a) The Contractor shall submit to the Construction Manager at the end of each calendar month a fully itemized statement showing the estimated value of the permanent work executed up to the end of the month based on the unit prices shown in the Contract and the section covering Valuation of Variations, together with a fully itemized statement of the value of major items of material and equipment on site for incorporation into the permanent works.
- (b) From each monthly statement including the statement based on the final measurement, the Construction Manager will prepare a Monthly Payment Certificate and will include therein so much as he considers fair and reasonable in respect of the value of the work executed and of the major items of material and equipment on site.
- (c) Ten percent (10%) of all monies due the Contractor in accordance with the Monthly Payment Certificate up to a limit of 10% of the contract price, shall be retained by the Owner (except as may otherwise be provided for in the Contract) and shall be termed the holdback.

- (d) The Monthly Payment Certificate will show the Construction Manager's gross valuation of the work performed and materials supplied, the deduction of the appropriate amount of holdback, the previous payments to the Contractor and the amount due him.
- (e) No progress estimate or payment shall be held to bind the Construction Manager in his valuation of the work on its completion and the Consulting Engineer may on any Monthly Payment Certificate make correction or modification to any previous certificate he has made.
- (f) At the time of issuance by the Construction Manager of the Certificate of Substantial Performance in accordance with Section 44 of the General Conditions, the Construction Manager shall:
 - (1) Notify the Contractor of the value of the maintenance security required by Section 43.
 - (2) Prepare a Substantial Performance Payment Certificate showing:
 - (i) the value of work completed to-date.
 - (ii) the value of outstanding or uncompleted work.
 - (iii) the value of the required maintenance security.
 - (iv) the amount of the 10% holdback (allowing for any previous release of holdback to the Contractor in respect of completed Subcontracts and deliveries of pre-selected equipment).
 - (v) the amount due the Contractor.
 - (3) Prepare a Payment Certificate releasing to the Contractor the 10% holdback due in respect of work performed up to the date of substantial performance. Subject to the submission by the Contractor of the following documents such holdback shall become payable after 45 days from the date of publication of the Certificate of Substantial Performance:
 - (i) A written undertaking by the Contractor to complete expeditiously any outstanding work and to discharge all unfulfilled obligations under the Contract.
 - (ii) The Contractor's final claim (except in respect of outstanding work).
 - (iii) A release by the Contractor in a form satisfactory to the Consulting Engineer releasing the Owner from all further claims relating to the Contract (except in respect of outstanding work).
 - (iv) A Statutory Declaration in a form satisfactory to the Consulting Engineer that all liabilities incurred by the Contractor and his Subcontractors in carrying out the Contract have been discharged and that all liens in respect of the Contract and Subcontracts thereunder have expired or have been satisfied, discharged or provided for by payment into Court.
 - (v) A satisfactory Clearance Certificate from the Workers' Compensation Board.
- (g) At the time of issuance by the Construction Manager of the Certificate of Completion in accordance with Section 44 of the General Conditions, the Consulting Engineer shall:
 - (1) Prepare a Completion Payment Certificate showing:
 - (i) the Final Contract Price.
 - (ii) the amount of the further 10% holdback (based on the value of further work completed over and above the value of work completed shown in the Substantial Performance Payment Certificate referred to in (f) above).
 - (iii) the value of the required maintenance security.
 - (iv) the amount due the Contractor.

- (2) Prepare a Payment Certificate releasing to the Contractor the further 10% holdback. Subject to the provisions of The Construction Lien Act and the submission by the Contractor of the documents required by Section 44 hereof, such further 10% holdback shall become payable after 45 days from the date of completion of the works as established by the Certificate of Completion.

29.0 PAYMENT OF INTEREST

Delay by the Owner in making payment to the Contractor shall be deemed not to be a breach of contract by the Owner.

In the event that, following substantial performance of the Contract or completion of the Contract as established by the relevant certificate issued by the Construction Manager, payment by the Owner to the Contractor in respect of work done or release of holdback is delayed by the Owner, the Contractor shall be entitled to payment of interest from a date or dates derived from the following:

- (a) Payment for Work Done:

A date 45 days after the date when the Contractor satisfactorily complete submission of the documentation required by the Contract and complied with the other requirements of the Contract.

- (b) Release of Statutory Holdback:

A date 30 days after the date established by Section 44 of the General Conditions, (whichever applies), as the earliest date for release of holdback.

The applicable rate of interest shall be that established from time-to-time by INAC.

30.0 SUSPENSION OF WORK

The Construction Manager or Consulting Engineer may, by an order in writing, at any time stop or suspend any part of the work, or direct any portion to be commenced or completed in priority to any other part or portion, or may cancel the order to proceed with the work, or with any part thereof, and the Contractor shall not thereby be entitled to any additional payment, or to claim for loss of profit or anticipated profit, or for damages or otherwise howsoever, by reason of such order except as may be allowed in accordance with Section 12 hereof. When in the opinion of the Construction Manager or the Consulting Engineer, it is deemed advisable for any reason to discontinue the work, or any part thereof, for the winter, the Contractor must, on notice of the required discontinuation, forthwith place the work in proper and satisfactory condition for the accommodation and safety of the public and for the effectual protection of the work against damage from rain, snow, frost, ice, or other causes, and must so maintain the work.

31.0 SUBLETTING

The Contractor shall keep the work under his personal control, and shall not assign, transfer, or sublet any portion without first obtaining the written consent of the Construction Manager. The consent of the Construction Manager to any such assignment, transfer, or subletting, shall not, however, relieve the Contractor of any responsibility for the proper commencement, execution, and completion of the work according to the terms of the Contract. If the Construction Manager consents to any such assignment, transfer or subletting the Contractor shall, either in person or through an accredited agent, receive all notices, communications, orders, instructions, or legal service, as if he were performing the work with his own plant and his own workers.

32.0 SETTING OUT

The Construction Manager will provide the Contractor in writing with bench marks and points of reference to be used by him in setting out the works. The Owner will be responsible only for the correctness of the information so supplied. From these bench marks and points of reference the Contractor will do his own setting out.

The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works, and for the provision of all necessary instruments and labour in connection therewith.

33.0 ASSISTANCE

The Contractor is to furnish the Consulting Engineer, the Contract Manager, or any of their assistants, with any reasonable help which he or they may require at any time in checking the work. He shall also furnish the said parties, or any of the Site Representatives, at all times, with convenient means of access to all parts of the works, and also with all required assistance to facilitate thorough examination of the same, and inspection, culling and removal of doubtful or defective material, and for any other purpose required in connection with the said works or in the discharge of their respective duties, for which services no additional allowance will be made.

34.0 MONIES DUE OWNER

All monies payable to the Owner by the Contractor under any stipulation herein or to the Workers' Compensation Board, may be retained out of any monies then due, or which may become due, from the Owner to the Contractor under this or any other contract with the Owner, or otherwise howsoever, or may be recovered from the Contractor or his surety jointly or severally in any court of competent jurisdiction, as a debt due to the Owner; and the Owner shall have full power to withhold any estimate or certificate, if circumstances arise which may indicate to it the advisability of so doing, though the sum to be retained may be ascertained.

35.0 DISPUTES

(a) Contractor's Claims

Any claim which the Contractor may have against the Owner based on any dispute or difference of any kind whatsoever arising out of the Contract or work shall not be ground for delay in the work but shall be referred by the Contractor in writing to the Construction Manager not later than fifteen (15) days after the Contractor becomes aware of the circumstances giving rise to such dispute or difference. Such reference shall contain a concise statement of the relevant facts. The Construction Manager may require any additional information.

The claim shall be settled by the Construction Manager who shall communicate his decision in writing to the parties and such decision shall forthwith be given effect by the parties, and the Contractor shall proceed with the works with all due diligence in accordance therewith whether or not such claim shall be referred to arbitration as hereinafter provided.

Except in those circumstances where it is provided in the Contract that the decision of the Construction Manager shall be final, any dispute or difference persisting after the delivery of the Construction Manager's decision shall, within thirty days, be referred to arbitration in accordance with the Arbitration Act of Ontario and as herein provided. Compliance by the Contractor with the provisions of Section 39 hereof and with time limits stipulated herein shall be a condition precedent to such arbitration.

The arbitration shall be by a board of three members except as provided for in the following paragraph hereof.

Either party shall notify the other party in writing of its desire to submit the dispute or difference to arbitration and the notice shall contain the name of the first party's appointee to the arbitration board. The recipient of the notice shall within fourteen (14) days inform the other party of the name of its appointee to the arbitration board. The two members, so selected, shall within fourteen (14) days of the appointment of the second of them appoint a third person who shall be a lawyer and who shall be the chairman of the arbitration board, unless the parties to the dispute agree that the said chairman need not be a lawyer.

Alternatively, the arbitration board may consist of a sole arbitrator provided that:

- (a) the Owner and the Contractor so agree, and
- (b) the Owner and the Contractor agree upon the person to be appointed as sole arbitrator.

Either party may appeal from the arbitration award.

Reference to arbitration by the Contractor as herein provided shall be a condition precedent to any legal action by him with respect to any dispute or difference of any kind whatsoever which the Contractor may have with the Owner arising out of the Contract or work.

- (b) Owner's Claims

Any claim which the Owner may have against the Contractor based on any dispute or difference of any kind whatsoever arising out of the Contract or work may, at the option of the Owner, and after notification in writing to the Contractor, be settled in accordance with the procedure set out in sub-section (a) hereof and the provisions thereof shall apply 'mutatis mutandis'.

36.0 RESTORATION

Where the Contractor enters into the lands, buildings, highways or roads under the jurisdiction and control of the Owners for the purpose of making a survey, examination, investigation, inspection or lays any pipes or appurtenances and in so doing disturbs any such lands, buildings, highways or roads, such lands, buildings, highways or roads shall be restored to their original condition without delay.

37.0 DRAINAGE

The Contractor shall keep all portions of his work properly and efficiently drained during construction and until completion, and he will be held responsible for all damage which may be caused or result from water backing up or flowing over, through, from or along any part of the works, or which any of his operations may cause to flow elsewhere. The Contractor shall dewater all work sites and excavations as necessary or as directed to enable the works to be constructed in a satisfactory manner. The Contractor shall not be entitled to any additional payment for compliance with the requirements hereof beyond the prices tendered for the construction of the works.

38.0 BARRIERS, LIGHTS AND DETOURS

The Contractor must, at his own expense, and without further or other order, provide, erect and maintain all requisite barriers, fences or other proper protection; and must provide, keep and maintain watchmen and lights with red globes, as may be necessary or as may be ordered by the Construction Manager, in order to ensure safety to the public as well as to those engaged about the premises or works. Should the Contractor neglect to carry out the above requirement, the Construction Manager is hereby authorized to place such watchmen, lights, barriers, etc., as are required, and to charge the cost to the Contractor, without relieving the Contractor of any claims for damages or accident. The Contractor must (where it is practicable in the opinion of the Construction Manager) keep the roadway open for travel for the use of the public, for such width as the Construction Manager may direct. Where, in the opinion of the Construction Manager, it is not practicable to keep a roadway open for the full flow of traffic, he may permit the Contractor to close or partially close such roadway and to provide for a detour of the traffic or a part thereof. In each such case and before putting into effect the closure or detour, the Contractor shall present his proposal for closure or detour to the municipal or other authority or authorities having jurisdiction over any of the roadways which will be affected by the proposed closure or detour and shall obtain the written authorization to such proposal of the said authority or authorities. The Contractor must provide a sufficient number of "NO THOROUGHFARE", "DETOUR" or other proper notices, which he must cause to be placed and maintained in good order in conspicuous places wherever any roadway, sidewalk, or thoroughfare is torn up or dangerous, and so long as it remains unsafe or unfinished.

When any work is carried on at night, the Contractor must supply, at his own expense, a sufficient number of electric or other approved and efficient lights, to enable the work to be done in an efficient and satisfactory manner, and the Construction Manager shall have the power to order additional lights to be put on at the Contractor's expense if in the opinion of the Construction Manager, they are or may be required.

39.0 ALTERATIONS, EXTRAS, DEDUCTIONS AND CLAIMS

The Consulting Engineer and the Construction Manager shall have the right to make or order any alterations and changes as they may deem advisable at any time before or during the execution of the works, including any line, grade, plan or detail thereof. The Consulting Engineer and the Construction Manager may suspend or omit any portion of the work, change the dimensions of any part of the works, vary the work contracted for, order any additional or extra work to be done, or order additional or extra materials to be furnished. Upon written orders from the Construction Manager the Contractor shall proceed with, carry out and execute the works as directed, shall supply such additional materials, and do such additional or extra work as the Construction Manager requires. The Contractor is not entitled to any extension of time for completion or any additional payment on account thereof, except only as herein provided.

Before commencing any work or procuring any materials required to do work beyond the requirements of the Contract, the Contractor must obtain a written order from the Construction Manager stating:

- (a) The work is an extra and will be paid for as such, clearly define the nature of such extra work or material, and the amount the Contractor is to receive, or the terms under which the work is to be paid for; or
- (b) The work is considered to be part of the Contract and not an extra and that no additional payment shall be made.

Before beginning any such work or commencing to deliver any such material, notify the Construction Manager in writing of his intention to commence work thereon or delivery thereof, so that a proper account or record of the same may be kept by the Construction Manager. If the Contractor proposes to claim additional payment for work or materials which the Consulting Engineer considers to be a part of the Contract and not an extra, the Contractor shall so notify the Construction Manager in writing before commencing such work or delivering such materials.

In case of the Contractor's neglect or failure to observe fully and faithfully the above conditions in this section contained, he shall forfeit all right to payment therefor which he otherwise might have had, and shall not make any claim in respect thereof, and if made, the Consulting Engineer may reject the same as invalid.

40.0 OTHER'S RIGHTS

The Contractor must afford all necessary and reasonable facilities to the Owner, any of its employees or workers, as well as to any company, corporation or person owning or operating any railway, tramway, wires, pipes, conduits, works or property, on, along, or near the line of the works. He shall notify all such parties before interfering with any of their property, rights or privileges and must work in harmony with them; otherwise he shall notify the Construction Manager in writing of his failure so to do, or of any difficulty that may at any time arise which he may be unable to overcome, in which case the Construction Manager shall deal with the matter as in his judgement may seem right or proper, and the Contractor shall abide by the decision and the direction of the Construction Manager. Any property of such parties which the Construction Manager orders to be moved by the Contractor must be handled with care, and must be neatly piled up and preserved free from injury or loss, and must be properly and satisfactorily replaced, all of which must be done by the Contractor without extra charge (unless specifically provided for in the Contract) and to the satisfaction of the Construction Manager. The Consulting Engineer shall have the right, at any time before or during the construction, or after the completion of the work, to open up any portion of the work or works, or the ground or roadway, or to grant permission for such opening to be made or left by the Contractor, as he, the Consulting Engineer, may deem advisable, for the purpose of examining, repairing or laying any water, gas or other pipe, sewer, drain, track or other underground or surface construction or to cause any such work as he may deem necessary or advisable to be done, and such permission, or the exercise of such rights, either by the Consulting Engineer or by any other person or corporation having the requisite authority (either statutory or otherwise) shall not relieve the Contractor from any of his responsibilities or obligations, nor shall the opening up of any portion of the work for these or any other purposes, or by any other parties, relieve the Contractor of such responsibilities or obligations, except only for the portion of the work actually torn up and destroyed, and then only in case the Contractor applies in writing for such relief at the time the work is being done, or within ten days afterwards, and can furnish sufficient cause, in the opinion of the Consulting Engineer, why such relief should be granted.

41.0 NON-FULFILMENT OF CONTRACT

If in the opinion of the Consulting Engineer or Construction Manager and at any time or times prior to the issuance of the Final Certificate, the Contractor neglects or fails to commence work, or becomes bankrupt or insolvent, or compounds with his creditors, or commits any act of insolvency, or transfers, assigns or sublets the Contract or any part thereof without the written consent of the Consulting Engineer/Construction Manager, or has not executed or is not executing the work or any part thereof in a sound and workmanlike manner and in accordance with the Contract, or is not performing the work so as to ensure its completion within the time stipulated in the Contract or has failed to complete the works within the said time, or fails or refuses to take down, rebuild, repair or rectify any imperfect work for which the Contractor is responsible, or fails to remove any condemned material or to replace such material with proper material, or fails to comply with any reasonable order given to him by the Consulting Engineer/Construction Manager, or abandons the work, or fails to observe or perform any of the provisions of the Contract, then in each and any such case the Consulting Engineer/Construction Manager shall, after giving the Contractor 48 hours written notice, have the right and power, at his discretion without process or action at law, to take possession and control of the whole work, or any part or parts thereof specified in the said notice, from the Contractor, and the Contractor, upon receiving the said notice, shall give possession and control of the said work, or the part or parts thereof specified in the said notice, peaceably to the Consulting engineer, and the Consulting Engineer/Construction Manager may employ such means as he may deem necessary or advisable to complete the work to his satisfaction with such changes therein as in the Consulting Engineer's/ Construction Manager's opinion are necessary or advisable by reason of the Contractor's non-fulfilment of the Contract as set out herein. In the event of an emergency in any manner due to the Contractor's non-fulfilment of the Contract as set out above or in Section 30 hereof, the Consulting Engineer/Construction Manager shall have the right and power at his discretion without process or action at law or any notice to the Contractor to take possession and control of the works, or any part thereof, from the Contractor and the Consulting Engineer/Construction Manager may take such measures as he may deem necessary or advisable to deal with the emergency and the decision of the Consulting Engineer/ Construction Manager as to the existence of such an emergency and as to the measures to be taken in regard thereto shall be final. If, in the event of an emergency as aforesaid, the Consulting Engineer/Construction Manager takes measures in regard there to as provided for above, he shall notify the Contractor thereof as soon after the commencement of the emergency as is practicable. The Contractor and his surety in every case provided for above shall be liable for all loss, damage, expense, expenditures and cost which may be incurred by reason of the Consulting Engineer's/Construction Manager's exercise of the rights and powers provided for herein. If the said loss, damage, expense, expenditure or cost exceeds the sum which would have been payable under the Contract if the same had been completed by the Contractor, the Contractor or his surety shall pay the amount of such excess to the Owner together with the amount of liquidated damages from the date fixed for the completion of the work, and the same may be deducted or collected by the Owner as provided for in Section 48, entitled "Monies Due Owner". All the powers of the Consulting Engineer/Construction Manager with respect to the Determination of any doubts, disputes and differences, and the determination of the sum or sums, or balance of money to be paid to or received from the Contractor or his surety in respect of the Contract, shall nevertheless continue in force. The fulfilment by the Contractor of any stipulation in the Contract may be enforced by legal proceedings and judgement, or order of court, without prejudice to any other remedy herein contained.

In case possession and control of the work, or any part thereof, is taken from the Contractor, the completion of the work shall not be delayed. Neither an extension of time for any reason beyond the date fixed herein for the completion of the Contract, nor the payment for any portion of the work shall be deemed to be a waiver by the Consulting Engineer, Construction Manager or the Owner of their rights under this Contract.

42.0 POUR RELEASE FORMS

Concrete shall not be poured until “pour release forms” have been signed by all trades, contractors and the Construction Manager.

43.0 MAINTENANCE SECURITY

The Contractor shall provide to the Owner for the duration of the period of maintenance, a maintenance security the value of which shall be derived from the following table:

CONTRACT PRICE		VALUE OF MAINTENANCE SECURITY \$
FROM \$	TO \$	
Less than 0.1 M		4% of Final Contract Price
0.1M	0.5M	4,000 on first 0.1M + 3.0% on next 0.4M
0.5M	1.0M	16,000 on first 0.5M + 2.4% on next 0.5M
1.0M	2.0M	28,000 on first 1.0M + 2.2% on next 1.0M
2.0M	4.0M	50,000 on first 2.0M + 2.0% on next 2.0M
4.0M	6.0M	90,000 on first 4.0M + 1.8% on next 2.0M
6.0M	10.0M	126,000 on first 6.0M + 1.5% on next 4.0M
Over 10.0M		186,000 on first 10.0M + 1.0% on balance

The maintenance security, which is at no time a part of the statutory holdback, shall be retained by the Owner in increments from monies that would otherwise be payable to the Contractor, commencing during the latter part of the period of construction, so that by the date of substantial performance of the contract the full value of the required maintenance security has been retained.

Except as otherwise provided hereunder, the maintenance security, less any deductions made therefrom as provided for in the Contract, plus interest thereon over the period of maintenance and compounded annually at the applicable rate(s) of interest set from time-to-time by the Minister of Finance shall be paid to the Contractor following the issuance by the Construction Manager of the Final Certificate at the end of the period of maintenance.

The Contractor may apply in writing to the Construction Manager who will request the approval of the Consulting Engineer at the time of substantial performance to substitute for the monies retained as the maintenance security an alternative maintenance security of equivalent or greater value comprising:

- (a) one or more irrevocable letters of credit, or
- (b) another readily negotiable security.

Acceptance of any such alternative shall be at the direction of the Consulting Engineer and the Solicitor for the Owner.

Following receipt and acceptance of any such alternative, the Construction Manager shall release to the Contractor the monies previously retained for maintenance security purposes.

The Construction Manager and the Consulting Engineer together may, in their discretion, allow the total maintenance security to be made up in part of monies retained under the Contract and in part of an alternative maintenance security as indicated in (a) and (b) above provided that the total value of such parts, as determined by the Construction Manager, shall be not less than the required value as derived from the table set out above.

Such alternative maintenance security or the monies derived therefrom, less any deductions made as provided for in the Contract, shall be released to the Contractor following the issuance by the Construction Manager of the Final Certificate at the end of the period of maintenance. Interest shall only be paid on monies, if any, derived from the said security and which remain unexpended in the maintenance security fund.

Where the Construction Manager proposes to release the statutory holdback to a Subcontractor through the Contractor as provided for in Section 44, hereof, the Consulting Engineer shall arrange for "the required maintenance security in respect of the said Subcontract", as referred to in Section 44 hereof, to be provided by a retention from monies that would otherwise be payable to the Contractor. The value of the required maintenance security shall be determined by applying to the value of the Subcontract work the same effective percentage retention, derived from the foregoing table, as applies to the Contract as a whole.

The Contractor may apply in writing to the Construction Manager to substitute for the maintenance security referred to in the preceding paragraph an irrevocable letter of credit in the name of the Contractor.

Following the substantial performance of the Contract, the Construction Manager may require the Contractor to consolidate all letters of credit provided pursuant to the foregoing into one or two letters of credit covering the Contract as a whole.

The Contractor shall allow his Subcontractors to provide letters of credit to the Contractor in conformity with the foregoing procedures. The Contractor shall provide the Consulting Engineer with copies of any or all such letters of credit on request.

44.0 CERTIFICATES OF COMPLETION - to be read with Section 28.0 of the General Conditions.

- (a) The Contract shall be considered as substantially performed when:
 - (1) the works have satisfactorily passed the required inspection and testing and are ready for use or are being used for the purposes intended, and
 - (2) the works are capable of being completed or, where there is a known defect, corrected at a cost of not more than:
 - (i) 3 percent of the first \$500,000 of the Contract Price plus,
 - (ii) 2 percent of the next \$500,000 of the Contract Price plus,
 - (iii) 1 percent of the balance of the Contract Price.
- (b) Where the works or a substantial part thereof are ready for use or are being used for the purposes intended but part of the works cannot be completed expeditiously for reasons beyond the control of the Contractor or where the Owner and the Contractor agree to delay completion of the works, the cost, as determined by the Construction Manager and the Engineer, of completing the outstanding work shall be deducted from the Contract Price in determining substantial performance and the value of the work completed.

- (c) As soon as, in the opinion of the Construction Manager and the Engineer, the Contract has been substantially performed in accordance with the foregoing, the Construction Manager will issue a Certificate of Substantial Performance.
- (d) The Consulting Engineer shall set out in the Certificate of Substantial Performance the date on which the Contract was substantially performed and within seven days after signing the said certificate he shall provide a copy to the Contractor.
- (e) Upon receipt of a copy of the Certificate of Substantial Performance, the Contractor shall forthwith, publish a copy of the said certificate in a construction trade newspaper. Such publication shall include placement in the Daily Commercial News.
- (f) Where the Contractor fails to publish a copy of the Certificate of Substantial Performance as required above within seven days after receiving a copy of the said certificate signed by the Consulting Engineer, the Owner may publish a copy of the certificate at the Contractor's expense.
- (g) Except as otherwise provided, the 45-day period prior to the release of holdback, shall commence from the date of publication of the Certificate of Substantial Performance as provided for in (e) and (f) above.
- (h) The works shall be deemed to be completed when:
 - (1) the works have satisfactorily passed the required inspection and testing, and
 - (2) the cost of completion of all outstanding work and known defects is not more than the lesser of:
 - (i) one percent of the Contract Price, and
 - (ii) \$1,000.00
- (i) As soon as, in the opinion of the Construction Manager, the works have been completed in accordance with paragraph (h) above, the Construction Manager will issue a Certificate of Completion on submission by the Contractor of the following documents:
 - (1) The Contractor's Final Claim.
 - (2) An up-to-date release by the Contractor in a form satisfactory to the Construction Manager releasing the Owner from all further claims relating to the Contract.
 - (3) An up-to-date Statutory Declaration in a form satisfactory to the Construction Manager that all liabilities incurred by the Contractor and his Subcontractors in carrying out the Contract have been discharged and that all liens in respect of the Contract and Subcontracts thereunder have expired or have been satisfied, discharged or provided for by payment into Court.
- (j) The Construction Manager shall set out in the Certificate of Completion the date on which the works were completed and within seven days of signing the said certificate he shall provide a copy to the Contractor.
- (k) **Payment due to the Contractor following issuance of the Certificate of Completion shall be as provided for in Section 28 hereof.**

- (l) On the expiration of a period of 12 months from the date of substantial performance, as set out in the Certificate of Substantial Performance, and after all known imperfect work has been rectified in accordance with the Contract and to the satisfaction of the Construction Manager and the Consulting Engineer to the best of their knowledge that the Contractor has discharged all his obligations under the Contract, the Construction Manager and the Consulting Engineer will issue the **Final Certificate approving the release to the Contractor of the maintenance security (see Section 44(h) hereof)**, less any deduction as provided for in the Contract.
- (m) On the expiration of a period of 12 months from the date of substantial performance, as set out in the Certificate of Substantial Performance, the Construction Manager may approve the release to the Contractor of a part of the maintenance security on such terms and conditions as the Construction Manager deems advisable notwithstanding that the Final Certificate has not been issued and that all imperfect work has not been rectified in accordance with the Contract.
- (n) The Construction Manager may in his discretion direct or approve that the works covered by the Contract be divided into two or more parts for the purpose of issuing Certificates of Completion and releasing holdback monies. In that event, the Contractor shall submit documentation as set out above in respect of each such part.

MCA CONSTRUCTION AND SAFETY GUIDELINES

SECTION 4

CONSTRUCTION SAFETY GUIDELINES

1. **SCOPE**

This section applies to the period of construction of all projects. It concerns the safety of the worker on the project and the public affected by the project.

2. **GENERAL**

No project shall be commenced or continued unless sufficient land space is available to permit compliance with all requirements.

3. **PUBLIC WAY PROTECTION**

When work is being carried out on a dwelling or other structure within 4.6m (15') of a public way, provision shall be made to protect the public, by a strongly constructed fence or boarding at least 1.8m (6') in height around the construction site. If the structure is 2m (6'-8") or less from the public way, overhead protection shall also be provided.

Where an excavation is more than 1.2m (4') deep, it shall be shored and protected by a barricade which shall be at least 1065mm (42") high and be located a distance equal to the depth of the excavation from the top of any wall of the excavation. Where an excavation is left open over night flashing lights shall be provided in each direction of the public way.

4. **TRAFFIC CONTROL**

Temporary roadways shall be marked for the passage of vehicle traffic. Workers directing traffic during working hours shall wear approved clothing, ie: a fluorescent and coloured (blaze orange or red) vest or hat and sleeves extending from above the elbow to the wrist. Signs shall be used to direct traffic during non-working hours.

If a major traffic way is obstructed when making service connections, procedures shall be established to allow emergency vehicles access around the obstructed area. Band Police or local law enforcement agency shall be requested to provide assistance.

5. **PERSONAL PROTECTIVE CLOTHING, EQUIPMENT AND DEVICES**

Every worker shall wear appropriate clothing (no loose sleeves etc.) and shall wear or use such protective clothing, equipment or device as is necessary for personal protection. This equipment may be, but is not limited to, safety hats, safety eyeglasses, safety footwear, ear protectors, gloves, etc.

6. **EXCAVATION**

All excavations shall be well marked for pedestrian and vehicle traffic with an access route marked for the passage of emergency vehicles. A worker shall be delegated to direct emergency vehicles in case of an emergency while work is in progress on site.

Care shall be taken not to damage any existing underground system (gas, water, sewer, electrical conduits) which shall be supported where necessary to prevent failure or breaking. Call before you dig.

No vehicle or other machinery shall be driven, operated or located so near to the edge of the excavation as to endanger a person by affecting the stability of the walls of the excavation.

Every excavation shall be kept reasonably free of water at all times.

No worker shall enter or remain in an excavation which is greater than 1.2m (4') in depth unless the excavation is properly shored.

7. HOUSEKEEPING

No object shall be placed where it is likely to endanger a worker or the public.

Formwork ties or nails protruding from concrete shall be removed or cut off as soon as the formwork has been removed.

Except where the scrap material or lumber is stored in an acceptable container for removal, waste material and debris shall be removed daily.

Each trade shall respect the work of other trades and shall keep the workplace clean and safe. Incomplete work shall be left in such state as not to be a potential hazard to other workers.

No material shall be thrown or permitted to fall freely from one story to another, or from a roof.

8. STORAGE OF MATERIALS

Material to be used on a project, or to be removed from a project, shall be stored in an orderly manner so as not to endanger any worker or the public. Care shall also be taken when moving or transporting material.

No construction material shall be stored, stocked or piled within 1.8m (6') of a floor or roof opening, or the open edge of a floor or an excavation, except where they can be handled by one worker and provided that the height of a pile is less than the distance of the face of the pile from the edge.

Lumber and similar materials shall be stored so that the pile is secure against collapsing or tipping. Crosspieces shall be used to provide stability on all piles of lumber exceeding 1.2m (4') in height.

Masonry units shall be stacked on level wood planks, platforms or bases in tiers with header units in the pile where necessary to provide stability. The pile shall not exceed 1.8m (6') in height.

Bagged material shall be piled with cross – piles on the exterior of the pile and be not more than ten bags high.

Pipe and reinforcing steel shall be stocked, supported or braced as to prevent accidental movement.

9. SANITATION

A reasonable supply of potable water shall be kept readily accessible for the use of the workers.

At least one flush toilet, chemical toilet or privy shall be provided or made available to the workers.

10. FIRE PROTECTION

A 4.5 kg (10 lb.) ABC fire extinguisher shall be provided at the construction site. If running water is available, a 15m (50') garden hose with a jet spray nozzle may be used.

Consult the local fire brigade chief to establish the fire protection measures available before work starts.

11. ELECTRICAL SUPPLY

Precautions shall be taken to prevent danger to the public or workmen from any live electrical conductors (wires) or from any electrical equipment.

A panel board shall be securely mounted on a vertical surface, kept clear of any obstruction, readily accessible, located in an area where water will not accumulate and be protected from the weather.

No worker shall use any cord-connected electrical equipment or tool unless the equipment is sufficiently grounded.

No worker shall bring any object, move a back-hoe shovel, crane or other similar lifting device or its load closer than the length of the boom of the lifting device to an electrical power line of more than 750 volts unless he has another worker stationed within his view to warn him when any part of the lifting device or its load is approaching minimum distance from the power line as shown on Table 11.A.

**Table 11.A
Forming part of Article 11**

MINIMUM DISTANCE FROM LIVE POWER LINES

<u>Voltage of Live Power Line</u>	<u>Minimum Distance</u>
750-15,000 volts	3.1m (10')
15,001-250,000 volts	4.6m (15')
Over 250,000 volts	6.1m (20')

12. CONSTRUCTION EQUIPMENT

All vehicles, cranes, machines, tools or other pieces of equipment shall be maintained in such condition that they will not endanger a worker when in use. For loading lifting equipment where equipment certification is required, the manufacturer's recommendations will be followed. Regular inspections will be conducted as per manufacturer's recommendations. A logbook of inspections, repairs, tests, modifications, etc. shall accompany equipment at all times. Inspections shall be conducted by a certified person.

No worker shall operate any piece of equipment on a project unless he has the required training and experience specific to the equipment being operated. For load lifting equipment requiring operator certification, the manufacturer's recommendation shall be followed. Regular inspections will be conducted as per manufacturer's recommendations. Proof of certification will accompany the operator at all times and may be requested from time to time.

No worker shall mount a platform, bucket or load support by a crane, hoist, fork-lift, front-end loader or similar machine.

Where the operator may be exposed to overhead hazards, a cab, screen or other adequate overhead protection shall be provided.

No person shall operate a power-shovel, backhoe or similar excavating machine in such a manner that any part of its load will pass over a worker.

No person shall begin to disconnect or carry out repairs on a pipeline under pressure until he has ensured that the disconnection or repair will endanger no person.

13. EXPLOSIVES

No fire or other flame shall be taken or be within 7.6m (25') of any magazine vehicle, building or place in which explosives are stored, handled or transported.

An acceptable, competent person shall be appointed by the superintendent to be in charge of all blasting, control and storage of the explosives.

14. PLATFORMS, RUNWAYS AND RAMPS

All runways, ramps or platforms shall be designed to hold the expected loads to be applied to them and be 485mm (19") or more in width. Slopes shall not exceed more than 300mm (1') vertically to 900mm (3') horizontally. Cross-cleats must be used on runs steeper than 1:3.

15. LADDERS:

All ladders shall be securely fastened and be placed so the base of the ladder is not less than one-quarter and not more than one-third of its length from the wall face. The ladder shall extend at the upper level a minimum of 900mm (3') with at least 150mm (6") clearance behind each rung.

When a stepladder is being used, the legs shall be fully spread and locked. The top of the stepladder and pail shelf shall not be used as steps.

16. STAIRS

Temporary stairs shall have a clear width of not less than 510mm (20"), be not more than 4.6m (15') vertically between landings and shall be equipped with handrails.

17. GUARDRAILS

Guardrails shall be provided at the perimeter, open sides and ends of a floor, scaffold, working platform, runway or ramp and be not less than 910mm (36") and not more than 1065mm (41") above the surface, floor, scaffold or roof.

18. SCAFFOLDS

No worker shall use a barrel, box or other loose object to stand upon while working, or to support a scaffold or working platform.

A scaffold shall be anchored and capable of supporting at least twice the maximum load to which it is likely to be subjected, and have uprights diagonally braced, with footings, sills, or supports capable of supporting the load.

The scaffold platform or other work platform shall be at least 460mm (18") wide.

A person with scaffold use training shall be responsible for the use of the scaffold.

19. FORMS AND FALSEWORK

Forms and falsework shall have sufficient bracing in the vertical and horizontal planes to prevent movement and bucking.

Falsework shall be braced to withstand all loads during and after placing of the concrete. Falsework design shall be approved by the design engineer or consultant or otherwise acceptable.

Forms or falsework shall not be removed unless the concrete has attained sufficient strength to support any load likely to be applied to it.

20. EXPLOSIVE ACTUATED TOOLS

All explosive-actuated fastening tools shall have a safety mechanism that will prevent the tools from being fired while being loaded, during preparation for firing, or if dropped; and be capable of operation only when the muzzle end is held against a working surface.

An explosive-actuated fastening tool shall be used only by a worker who has been instructed in the proper and safe manner of its use and who is wearing safety protection equipment (safety hat, safety glasses, safety boots and ear protection)

The load for an explosive actuated fastening tool shall be so marked that the operator can identify its strength. The load and tool shall not be left unattended and when not in use, shall be stored in a locked container.

21. SMOKING

Where conditions are such as to make smoking a fire or explosion hazard, smoking shall be permitted only in specifically acceptable smoking areas.

The areas where smoking is not permitted shall be identified by signs. Signs prohibiting smoking shall have black lettering at least 50mm (2") high with a 12mm (1/2") stroke on a yellow background. Symbols at least 150mm (6") by 150mm (6") may be used in lieu of lettering.

Schedule of Fines and Procedures for Infractions of Safety Procedures

First warning will be a verbal warning to employee of breach of safety procedure and to Employer/Contractor by Safety Officer of the Department of Infrastructure, Housing, and the Environment.

Second warning must be a written warning to Employee of a continuing breach of the same safety procedure and to Employer/Contractor by Safety Officer of the Department of Infrastructure, Housing, and the Environment.

Third warning following a continuing breach of the same safety procedure results in written notice to Employee as well as to the Employer/Contractor by the Safety Officer of the Department of Infrastructure, Housing, and the Environment. This written notice documents the two previous infractions and levies the fine. The fines may not exceed a maximum of:

- a) \$500.00 for Employee
- b) \$5,000.00 for Employer/Contractor

Following the imposition of fines, further persistent breaches of safety procedures will result in termination of the contract between the Employer/Contractor and the Mohawk Council of Akwesasne.

MCA CONSTRUCTION SAFETY PROGRAM

SECTION 5

CONSTRUCTION SAFETY PROGRAM

Introduction

All accidents in Akwesasne can be prevented.

Working to this goal is expected of each employee of the Mohawk Council and all contractors, subcontractors and their employees.

Safety Policy

Working safely is a condition of awarding contractors and for any individual's presence on Mohawk Council Construction Projects.

All contract work at Akwesasne must be performed in full compliance with Ontario Health and Safety Standards and additional procedures as set out by the Mohawk Council Infrastructure, Housing, and the Environment Safety Department.

Failure to comply may be used as a basis for denying an individual permission to work on Mohawk Council projects.

All work performed at Akwesasne must be done in full compliance with Ontario Regulations 213/91 Construction Projects, Occupational Health and Safety Act. Also, the Construction Health and Safety manual published by the Construction Safety Association of Ontario. This manual is easy to read and well illustrated; copies are available at the Infrastructure, Housing, and the Environment Safety Office.

Planning and Communication Safety

- Work Plan
- Hazard Identification
- Safety Meeting

All work activity must be planned as follows:

1. Work Plan

A weekly work plan for the following week must be completed each Friday, outlining the work planned.

2. Hazard Identification

A weekly work plan for the following week must be completed each Friday, identifying the safety hazards, potential accidents, safety procedures to be followed and safety equipment to be used to prevent any accident or injury when performing the planned work.

3. Weekly Safety Meeting

A safety meeting must be held on the morning of the first working day of each week. The weekly work plan and hazard ID sheet will have created the agenda, ie: the work plan for the week

- ~ hazards in performing the planned work
- ~ safety procedures to follow
- ~ safety equipment to be used

Each employee in attendance is required to sign “report of the meeting” in the space provided. It is each contractor’s responsibility to ensure that the above procedure is strictly followed by his supervisors, foreman and subcontractors.

Copies of the weekly work plan (a) and hazard identification sheet (b) are to be delivered to the MCA Safety Office by 2:00 p.m. every Friday.

A copy of the safety meeting report is to be delivered to the MCA Safety Office by 2:00 p.m. of the first working day of each week.

Forms (a), (b) and (c) will be provided by MCA Safety Office. The MCA Safety Coordinator will provide assistance if required to complete forms (a), (b) and (c).

Safety Audits/Site Inspections

The MCA Safety Coordinator conducts random site safety audits on a daily basis and a formal safety audit every week on all MCA construction projects. Any unsafe conditions or unsafe act is recorded.

We require that the site supervisor accompany the Safety Coordinator on these weekly audits. ANY UNSAFE CONDITION OR ACT MUST BE CORRECTED IMMEDIATELY.

A written report is made of each audit and copies distributed to Project/Construction Managers and Site Supervisors.

MCA Safety Coordinator

The role of the MCA Safety Coordinator is a supportive one, providing assistance and guidance in all safety concerns. His/Her role in safety in no way relieves the contractor’s responsibility for the safety of their employees including subcontractor employees.

PLAN SAFETY INTO EVERY WORK ACTIVITY
THE BETTER THE PLAN
THE BETTER THE RESULT

AGREEMENT

I, _____
(Contractor's Name)

agree to comply with all of the above safety requirements.

Signed

Date

WORK PLAN

Contractor _____

Foreman _____

for week starting Monday, _____

ACTIVITY #	WORK PLAN	MON.	TUES.	WED.	THURS.	FRI.	SAT.	SUN.

Contractor _____

Foreman _____

Date _____

Mohawk Council of Akwesasne

HAZARD IDENTIFICATION SHEET

NO.	WORK ACTIVITY	HAZARDOUS CONDITION	POTENTIAL ACCIDENT	PREVENTATIVE MEASURES	SAFETY EQUIPMENT REQUIRED

MOHAWK COUNCIL OF AKWESASNE

WEEKLY MONDAY MORNING

SAFETY MEETING

HAZARD IDENTIFICATION

(list of attendees to be included with minutes)

Contractor _____ Foreman _____ Date _____

SAFETY HAZARDS TODAY (refer to Hazard Identification Sheet)			
PREVENTATIVE ACTIONS AND SAFETY EQUIPMENT REQUIRED		EMPLOYEE SUGGESTIONS	
ATTENDEES	✓	ATTENDEES	✓
SAFETY DOESN'T HAPPEN BY ACCIDENT			

MCA SPECIAL PROVISIONS

SECTION 6

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1. **USE OF SITE AND FACILITIES**

It is essential that the on-going operations of the homeowners/occupants be maintained with minimal disruption during the period of new construction and alterations/modifications.

2. **PARKING CONSIDERATIONS**

Parking for construction personnel shall be at designated locations.

3. **TRAFFIC CONSIDERATIONS**

It will be necessary to make provisions for the movement of vehicular traffic at all times. The Contractor will be responsible for performing the work so that the least inconvenience is caused to traffic. Temporary traffic measures to be in accordance with Ontario Traffic Manual Book 7.

Flagging for traffic control on this contract shall be in conformance to Mohawk Council of Akwesasne Construction Safety Guidelines.

Workers directing traffic during working hours shall wear approved clothing - ie: a fluorescent and coloured (blaze orange or red) vest, or hat and sleeves extending from above the elbow to the wrist. Signs shall be used to direct traffic.

4. **CONSTRUCTION SCHEDULE**

Upon the award of the contract, Contractor shall, **within seven days** from receipt of MCA's letter of intent to commence work, and submit his schedule to the Construction Manager for approval.

The schedule of construction should clearly show in weekly stages the proposed progress on the main items and sub-trades of the contract. The Construction Manager may require the Contractor to revise the schedule at any time.

The Contractor shall provide a list of names of all construction crews to be employed for the duration of the contract.

5. **EXISTING SERVICES AND USE OF FACILITIES**

Execute work with least possible interference or disturbance to the normal use of premises.

Install a portable toilet facility on premises for the use of construction workers.

Work is to be performed in such a manner as to be transparent to the residents, all construction materials, tools, equipment shall be kept within the contract limits throughout construction.

The work site is deemed to be under the sole control of the contractor and shall accept full responsibility for full time security of the work site, and for materials stored within.

6. **HEALTH AND SAFETY**

Comply with the terms from MCA Construction Health and Safety Guidelines referred to in these specifications as well as the Ontario Safety Act.

The Contractor is to supervise and instruct employees in safety practices as set out in the Occupational Health

and Safety Act and Regulations for Construction projects, latest amendments, including WHMIS training.

Provide and/or enforce the use of all safety equipment, apparatus and clothing, etc. as required by Act and regulations. Ensure that any sub-trade employed provides and/or enforces the use of all safety equipment, apparatus and clothing for all of their work forces.

Erect and maintain warning signs where the need exists. Provide and maintain suitable illumination during the hours of darkness at all danger points.

Do not close or obstruct streets, sidewalks, exits, passageways or parking areas without permission from the Volunteer Fire Department and the Department of Infrastructure, Housing, and the Environment.

Ensure that no part of the work is loaded during construction with a load greater than it is able to bear safely.

7. **REMOVED MATERIALS**

The Contractor shall be responsible for removed material. For disposal of excess or unsuitable materials, see appropriate item specification.

8. **NEW MATERIAL STORAGE**

Contractor is responsible to store and protect all materials on site from damage or vandalism prior to installation. Any damaged material so designated by the Contract Administrator shall be removed and replaced at no additional cost to the Owner.

9. **NOISE LIMITATION**

Cooperate at all times to keep noise to a minimum, ie: trucks and similar equipment.

10. **CLEAN-UP**

Clean-up promptly during the progress of work and remove all debris from the site.

At the completion of the work, remove from the project, all tools, equipment, surplus products, temporary enclosures or partitions, etc. Daily housekeeping and clean-up and the care and handling of products required in connection with the work is a requirement of the Contract.

11. **CONTRACT LIMIT**

The Contractor shall confine his operation to the limit of the site, unless specified or shown otherwise, or unless otherwise directed by the Construction Manager or unless written approval is received from the property owners concerned.

12. **PROTECTION**

Protect finished work and adjacent areas against damage until take-over.

SPECIFICATIONS

SECTION 7

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Part 1 General

1.1 GENERAL

- .1 These specifications shall be read in conjunction with and comply with the drawings and all other sections of the Contract Documents. All conditions of the Contract apply to this work of this section.

1.2 DESCRIPTION OF WORK

- .1 St. Regis Police Station Site Upgrades Project No. 24-5090F– The work consists of removal of existing fence, concrete, and asphalt, localized civil improvements including: tree limbing, concrete curb and walkway, excavation of landscape areas and installation of granular sub-base and base, scarifying and reshaping existing granular materials, paving, fencing and line painting. Electrical improvements include: new power, controls, and communications requirements for the new pivot gate, push buttons, and traffic loop. This includes ducting, wiring, connection to existing power and communications inside the police station, testing, and commissioning.
- .2 The work included in this Contract shall consist of the supply of all materials, labour and equipment for the complete installation of the works in accordance with the accompanying Plans and Specifications.

1.3 LOCATION OF THE WORK

- .1 The location of works is at address 73 Sweetgrass Lane, St. Regis, Quebec, in the Territory of the Mohawks of Akwesasne.

1.4 NATURE OF SITE

- .1 The Contractor shall make a careful examination of the construction area/site and shall take all such steps as are necessary to ascertain the conditions under which the works are to be carried out. No extra money shall be payable to the Contractor due to soil conditions nor groundwater adversely affecting his work or any other matter affected by the construction area/Site.
- .2 There was no site-specific soil investigation completed for this project. Subgrade material is generally bouldery till.
- .3 The Tenderer shall conduct such further investigations concerning subsurface ground conditions as he deems necessary to inform himself of the subsurface conditions which will be encountered during construction.

1.5 DAMAGE

- .1 The Contractor shall take precautions at his own expense and as deemed necessary by the Engineer to protect all existing works, utilities, and property from damage as a result of construction operations. If any damage should occur, the Contractor shall make good all such damage at his own expense as soon as possible after the damage has been done.

1.6 SUBSTANTIAL PERFORMANCE

- .1 The date of Substantial Performance shown on the Certificate of Substantial Performance will be the date of satisfactory completion of the Contractor's period of start-up operation or a date thereafter.

1.7 FLOTATION

- .1 The Contractor shall take all necessary precautions against the flotation of any structures during construction. The Contractor shall be responsible for any damage caused by flotation and any expense incurred in making good such damage shall be borne by the Contractor.

1.8 PRIVATE LANDS

- .1 The Contractor shall not enter private lands unless he has the Property Owner's written permission to do so and shall assume full responsibility for any and all claims which might arise as a result of such entry.
- .2 A copy of the Property Owner's written permission shall be submitted to the Engineer before any entry is made onto private lands.

1.9 STORAGE OF MATERIALS

- .1 Materials shall be stored separately on the Site and shall be suitably protected to prevent their deterioration or the intrusion of foreign matter. In the opinion of the Engineer, any material which has deteriorated or been damaged shall be removed immediately from the Site at the Contractor's expense.

1.10 AUTHORITY CROSSING

- .1 Herein, "Authorities" means all Utilities, Commissions, Departments and Ministries having authority over or ownership of any lands rights-of-way, or easements which may be affected by this Contract.
- .2 On all Authority crossings, the respective Authority will provide an inspector to ensure that the Work is to their satisfaction. The cost of such inspection will be borne by the Owner.
- .3 The Contractor shall cooperate in all respects with all Authorities and shall prepare a schedule of operations for the work jointly with each Authority. A copy of each schedule shall be submitted to the Engineer.
- .4 No Work shall be started until the inspector for the Authority being crossed is on the Site and until the Engineer has given his approval to commence the Work.
- .5 The Contractor shall be fully responsible for any damage done and for any infraction of the rules or regulations of any Authority in the execution of his Work.
- .6 On the completion of his Work, the Contractor shall clean up and restore the disturbed area to its original condition prior to construction to the complete satisfaction of the respective Authority and of the Engineer.

1.11 REQUIREMENTS OF AUTHORITIES AND AGENCIES

- .1 The Contractor shall be responsible for complying fully with the requirements of all Authorities and Agencies such as Labour Canada and Coast Guard which govern any or all of the Work under this Contract. These requirements may affect installation and construction methods and may include a written notice to an Authority or Agency prior to the commencement of construction. When a written notice to an Authority or Agency is required, a copy of the notice shall be submitted to the Engineer by the Contractor.

1.12 SPECIFIED MATERIAL SUBSTITUTION

- .1 The specification and designation by a trade name of any material or article shall be considered to be followed by the phrase "or reviewed equivalent". Substitution for any specified or designated material or article will only be made upon written approval of the Engineer.

1.13 INCONVENIENCE AND RIGHT OF ACCESS

- .1 The construction of the works shall be carried out in such a manner that a minimum of inconvenience is caused to the owners and occupants of properties adjacent to the Works.
- .2 Where a utility is to be installed across a driveway which provides access to the adjacent property, the Contractor shall notify the owner or occupants of the adjacent property 48 hours prior to the commencement of any construction which may affect their access.
- .3 If, in the opinion of the Engineer, the Contractor has not or cannot complete the installation of a utility across a driveway and subsequently restore normal access to the adjacent property within a reasonable length of time, the Contractor shall provide an alternate means of access forthwith at his own expense.

1.14 EXAMINATION OF WORK OF OTHER TRADES

- .1 The Contractor shall examine the work of all trades and ensure that conditions are satisfactory for the completion of any subsequent work.
- .2 The Contractor shall notify the Engineer immediately of any adverse conditions which may affect subsequent Work and shall not proceed with any subsequent Work until such conditions are rectified.

1.15 PREPARATION FOR TRADES

- .1 The Contractor shall make all necessary preparations in his Work to provide for the satisfactory connections to and execution of all trades affected.
- .2 The Contractor is responsible for the supply of any articles which are to be built in by the trades and shall provide such drawings and instructions as may be necessary for their proper location and installation.

1.16 NOTICE TO TRADES

- .1 The Contractor shall provide all trades with sufficient notice when materials to be set by the trades are required to be supplied and/or installed.

1.17 PROTECTION OF WORK AND MATERIALS

- .1 The Contractor shall protect the materials and the finishes of the Work from damage. This required protection shall be in effect up until the final acceptance of the completed Work.

1.18 SPECIFICATIONS

- .1 The Contractor shall have a copy of these Specifications, and all other Standard Specifications or parts of Specifications referred to herein on the Site at all times. All Specifications shall be producible upon demand of the Engineer. Failure to have copies of all Specifications on the Site will be considered an infraction to the Contract.

1.19 SCHEDULING

- .1 The Time for Completion shall be kept to a minimum and may have a bearing on the award of the Contract.
- .2 The Contractor shall submit a schedule for construction at least 7 days prior to commencing any work.

1.20 SHOP DRAWINGS AND OPERATING MANUALS

- .1 Submit shop drawings for all material to the Engineer for review.
- .2 Submit six (6) prints of shop drawings in accordance with the General Conditions.
- .3 Prior to submission, check and certify as correct, shop drawings and product data sheets. Issue to Engineer each submission at least 7 days prior to being required. The Contractor must not commence work on items covered by shop drawings before the Engineer's review is received by the Contractor.
- .4 The Contractor is responsible for confirming fabrication processes and techniques of construction, and for coordinating the work of the trades.
- .5 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Engineer's review of submittal.
- .6 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
- .7 Submit complete operation and maintenance manual to Engineer 2 weeks prior to application for Interim Certificates of Completion of project.
- .8 Submit copies in typed English and organize data into same numerical order as contract specifications. Drawings, diagrams and manufacturer's literature must be legible.
- .9 Material: label each section with tabs protected with celluloid covers fastened to the hard paper dividing sheets.
- .10 Binders: vinyl, hard covered, 3 "D" ring, loose leaf, sized for 215 x 280mm paper, with spine pocket.
- .11 Identify contents of each binder on spine.
- .12 Binder 1:

- .1 Cover sheet containing:
 - .1 data submitted
 - .2 project title, location and project number
 - .3 names and addresses of Contractor, and all sub-contractors
- .2 Table of Contents of all binders
- .3 List of maintenance materials
- .4 List of spare parts as specified
- .5 Warranties, guarantees
- .6 Copies of approvals, and certificates
- .7 Bind separately one complete set of reviewed final shop drawings and product data.

1.21 ADDITIONAL DRAWINGS

- .1 Engineer may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.22 PRECONDITION SURVEY

- .1 Prior to commencement of operations, the Contractor shall file with the Owner and Contract Administrator a precondition survey of all structures and appurtenances of properties adjoining the work. This survey shall include but not be limited to a complete digital photographic and descriptive record, water levels, existing damage, or lack thereof. A video of the contract area and abutting properties is to be completed by the Contractor and submitted to the Contract Administrator prior to commencement of construction. The contractor to indemnify Owner against any claim by abutting property owners for damages sustained due to any construction activities.

1.23 ENGINEER'S FIELD OFFICE (NOT REQUIRED)

1.24 PROTECTION

- .1 Protect existing work from damage.
- .2 Replace damaged existing work with material and finish to match original.

1.25 CONTRACT DRAWINGS

- .1 The Contractor shall locate all buildings and structures which may be affected by the construction of the Works. The Contract Drawings do not necessarily show all buildings and structures located outside the road rights-of-way.

1.26 PROTECTION OF PUBLIC TRAFFIC

- .1 The Contractor shall proceed with the construction of the Work in such a manner as to minimize traffic interruption. The Contractor shall provide a traffic management plan to the Engineer ten (10) days prior to the start of construction showing proposed traffic controls at various stages of his operations for both vehicular and pedestrian traffic.
- .2 The traffic management plan is to include documentation of the following: the Contractor shall notify the Police Department and ambulance emergency services of the proposed interruption and obtain their approval of the intended method of traffic diversion, location of signs, barricades, and

flagmen. Having obtained this approval, the Contractor shall then inform the Fire Department and schools of the area affected by construction in advance of any programme of street blockage and detour.

- .3 The Contractor is to schedule his operation in such a manner as to cause the least interference to vehicular and pedestrian traffic. Pedestrian and vehicular traffic must be maintained for the duration of construction unless otherwise approved by the Engineer.
- .4 The Contractor shall supply and maintain signs, delineators, barricades, flashing lights to mark approaches to the work site to the satisfaction of the Engineer and in conformance to MCA Special Provisions and MCA Construction and Safety Guidelines.

1.27 EROSION AND SEDIMENT CONTROL MEASURES

- .1 The Contractor must provide the necessary protection measures to ensure that all waterways, swamps and private property are protected from contamination during construction.
- .2 Erosion and sediment control could include a combination of straw bales, silt fences, and rock check dams. Culverts and drainage outlets that are susceptible to high run off are to be protected from erosion and sediment migration. The methods used are the responsibility of the contractor. These methods are intended as prevention and should be installed prior to construction in anticipated sensitive areas not after the damage is done.

1.28 DEWATERING, PUMPING AND DRAINAGE

- .1 The cost of dewatering, sheet piling, or flow diversion to facilitate the excavation and any other pumping and drainage necessary in the construction area for the proper construction and inspection of the Works, shall be borne by the Contractor.
- .2 Dewatering systems may include sheet piling or other methods. Contractor is solely responsible for determining and providing such methods as may be necessary for construction of the works under dry conditions.
- .3 The Contractor shall dispose of all groundwater and surface runoff including that from snow and ice in a manner approved by the Engineer, and the MCA Environmental Department.

1.29 DAMAGE TO EXISTING UTILITIES AND STRUCTURES

- .1 The Contractor shall, at his own expense, obtain the necessary drawings and perform any necessary sub-surface investigations in order to determine the exact number and location of all existing utility services, structures, underground pipes, cables, and other similar items. The location for existing structures and underground pipes, cables, utilities, and other similar items as shown on the Contract Drawings does not relieve the Contractor of this responsibility.
- .2 The Contractor shall take the necessary steps to ensure that no damage is caused to existing structures, buildings, foundations, roads, sidewalks, fish habitat, property, utility services, and other similar items during the progress of the Work.
- .3 If any damage is caused, the Contractor shall repair and make good such damage at his own expense within a reasonable time and to the complete satisfaction of the Engineer.
- .4 Contractor to locate and mark all known survey monuments in the area of the proposed works including stockpile and staging areas which may be damaged/removed during construction. All stakes, marks, monuments and reference points shall be carefully preserved by the Contractor and

in the case of destruction or removal by the Contractor or any sub-contractor engaged by the General Contractor, shall be located and replaced at the Contractor's expense. Any replaced survey monument must be re-certified by an Ontario Land Surveyor as to their exact location and coordinates.

- .5 As noted on the drawings certain hydro poles to be protected during construction. Contractor acknowledges that they have contacted Cornwall Electric to determine proposed method of protection. Contractor shall be directly responsible for any and all costs from Cornwall Electric, if for example standby, pole reinforcement or temporary support charges may apply. Contractor acknowledges that regardless of the method of protection, costs have been included in the appropriate contract items and no additional payments will be made.

1.30 OBSTRUCTION OF UTILITY SERVICES

- .1 The Contractor must ensure that all existing hydrants, valve boxes, curb stop boxes, fire or police call boxes, or other utility controls shall remain unobstructed and accessible during the construction of the Work.

1.31 OPERATION OF UTILITY SERVICES

- .1 The Contractor shall obtain written approval from the Engineer and from the Utility concerned before operating any valve, switch, or other control on existing utility services.
- .2 All consumers affected by such operation shall be notified by the Contractor, before the operation, of the date, time and probable length of time of service interruption.

1.32 WATER AND ELECTRICITY FOR CONSTRUCTION

- .1 The Contractor shall supply water and electricity for the construction of the Works at his own expense. If existing water and electric services are used, the Contractor shall pay for such services at the rate agreed upon by the Contractor and the Utility concerned.

1.33 TESTING

- .1 When requested by the Engineer, and in his presence, the Contractor shall allow for the performance for all tests and analysis of materials, equipment, and structures in accordance with the relevant clauses of this Specification. All facilities, labour, and materials required for the satisfactory performance of these tests, analysis, and inspections, whether on the Site at the place of delivery, at the manufacturer's testing laboratory, or at an independent testing laboratory shall be paid for under the testing allowance.

1.34 FIRST AID EQUIPMENT

- .1 The Contractor shall provide and maintain in clean, orderly conditions, a completely equipped first aid kit, MSA FA 1035 or equal, and a stretcher, MSA 30161 or equal. Both first aid kit and stretcher shall be readily accessible, at all times to the Contractor's employees and to the Engineer's staff.
- .2 Properly instructed employees shall be placed in charge of the first aid equipment and at least one such employee shall be available at all times when Work is being carried on to render first aid at the main point of operation. The telephone numbers of the nearest hospital, doctor, ambulance, police, and fire departments shall be prominently posted at all telephones on the Site.

1.35 MINIMUM STANDARD

- .1 The Specifications and Contract Drawings define a minimum standard of Workmanship. The Contractor shall include in his Tender the cost of any additional Work or improvements in the quality of the Work, that he may consider necessary to unconditionally guarantee the performance of the completed Work in conformity with the Contract for the Guarantee and Maintenance Period.
- .2 All work shall comply with the following standards and codes: AWWA, National Building Code, MOE, MTO, MCA, OPSS, OPSD, CSA, etc.

1.36 WORKMANSHIP

- .1 The quality of the workmanship and materials shall be first class and the Work shall present a neat and attractive appearance when finished.
- .2 If ordered by the Engineer, the Contractor shall make enough openings in the Work and/or materials as are necessary to inspect the Work.
- .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 conditions, the expense of such opening and closing will be borne by the Owner.

1.37 WORK CARRIED OUT IN WINTER

- .1 When Work is carried out in freezing weather, all crushed stone, sand, water, and other such materials shall be heated in compliance with the Engineer's requirements and the Work shall be protected from damage by frost during and after placement. The Contractor shall provide, at his own expense, the necessary means of heating the materials. Contractor shall also be responsible for heating the interior of the buildings throughout the winter months, until the date of substantial completion.

1.38 PREVENTATIVE MEASURES

- .1 The Contractor shall submit with his Construction Schedule, a list of procedures he intends to follow during construction, which will prevent interruption of service to the existing utilities including hydro, telephone, water and sewer.

1.39 NOISE CONTROL

- .1 The Contractor shall ensure that noise from machinery, motors, pumps, and other similar equipment be kept to a minimum. If machinery, motors, pumps, and other similar equipment must be operated beyond the normal working hours, the Contractor shall bear the cost of housing such equipment in order to keep the noise to a level acceptable to the Engineer.

1.40 SAMPLES

- .1 Samples of materials and workmanship shall be provided as required by the Engineer. The Contractor shall bear the expense of providing samples and proper storage as required.
- .2 No material used in the work shall be inferior in any way to the material approved.

- .3 Approval notwithstanding, the Engineer may reject materials delivered to the site and subsequently found to be unsuitable or unsound.

1.41 MATERIAL CERTIFICATION

- .1 With each shipment, submit manufacturer's test data and certification that pipes, fittings, valves and other materials meet CSA certification and other requirements of this section.
- .2 Arrange for a representative of the equipment manufacturer to visit the site at appropriate times to ensure satisfactory installation and operation of the equipment.

1.42 OPERATING AND MAINTENANCE MANUALS

- .1 Contractor shall submit three (3) copies of equipment operating manuals with shop drawings for major equipment items, and other maintenance instructions in bound form, as required by each division of these specifications.

1.43 "AS-BUILT" DRAWINGS

- .1 As a condition of issuance of the Certificate of Completion the Contractor shall submit to the Engineer the "As-Built" drawings neatly marked up in red ink.
- .2 Payment for the item "As-Built" drawings will be upon submission of a complete set of as-built drawings to the satisfaction of the contract administrator.

1.44 PROJECT MEETINGS

- .1 The contractor shall attend regular meetings with the Engineer at the Contractor's site offices, to discuss the progress of the work and co-ordinate the work of subcontractors, etc.
- .2 The Contractor Superintendent shall attend these meetings and shall notify any subcontractors or other persons whose presence is required at the meetings.
- .3 Minutes shall be recorded by the Engineer and shall take note of persons in attendance and will show major decisions made and instructions given.
- .4 Minutes of the meetings shall be binding on both parties.

1.45 PROJECT CLOSEOUT

- .1 Items under this section shall generally be carried out on completion of the contract except where directed or approved by the Engineer, they may proceed during the project.
 - .1 Final Cleaning:
 - .1 When the work is completed, the contractor shall remove all of his surplus products, tools, construction machinery and equipment not required for the performance of the remaining work. He shall also remove any waste products and debris and leave the work clean and suitable for occupancy by the Owner unless otherwise specified.
 - .2 All final cleaning shall be carried out under this section and the work shall be left in condition to meet the approval of the Engineer. The final cleaning shall not be commenced until authorized by the Engineer.

- .3 The Contractor shall remove all temporary buildings and structures built by him and all construction materials and debris from the site of the contract. The Contractor shall remove and acceptably disinfect all materials containing organic matter, in, under and around buildings used by him and rubbish of all kinds from any ground which he shall have occupied and shall leave the site in a neat and satisfactory condition.
- .4 The Contractor shall re-erect all fences that are disturbed, in a suitable manner to ensure their stability, and to the approval of the Engineer.
- .5 All other surfaces, structures and property damaged or disturbed shall be restored in a manner conforming to their original condition or construction as noted by the Engineer.
- .6 All roadways, berms and driveways along the line of the work shall be restored in the manner and to the conditions as specified elsewhere.
- .7 The Contractor shall, upon verbal and/or written notice, take immediate steps to repair or make good settlement or defects in the surfaces which appear during the period of guaranteed maintenance, or until assumed by the Owner.
- .8 Should settlement or defects which are, in the opinion of the Engineer, of a dangerous character, develop along the line of the work during the guaranteed period and require immediate repair, the Owner reserves the right of supplying any necessary labour and material to be charged to the Contractor and to be deducted from any monies due or to become due to him without first notifying the Contractor of these defects. The Engineer will, however, immediately notify the Contractor upon completion of such repairs, indicating the cost thereof.
- .9 All buildings, walks, fences, pavements, curbs, gutters, driveways, boulevards, conduits or transmission lines which suffer damage due to excavation during the guaranteed period, shall be repaired by the Contractor at his own expense.
- .10 All private sidewalks and driveways, which are broken, injured or disturbed in the execution of this contract, are to be restored to their original condition by the Contractor at his own expense.
- .11 All debris, rubbish and scrap pieces resulting from clean-up operations shall become the property of the Contractor and shall be removed from the site in such a manner as to create no nuisance in the streets nor to the adjoining property owners.
- .12 No debris or other material shall be burned without written approval of the engineer.

1.46 MAINTENANCE PROGRAMS

- .1 Before the Contractor leaves the site, he is required to submit a letter setting out the arrangement he has made for the carrying out of maintenance work up to the end of the warranty period. This letter shall give a telephone number and address for the receipt of notices relating to maintenance. Unless the Contractor's headquarters are close to the site of the works, he shall be required to make satisfactory arrangements with a local contractor for attending to surface maintenance work, or with MCA for same to be carried out by the Department of Infrastructure, Housing, and the Environment at his cost.
- .2 A copy of the Contractor's purchase order on such arrangement shall be provided for the Engineers. Failure of the Contractor to make such arrangements and submit a copy of his purchase order for same to the Engineers may delay processing of the Completion Certificate and accompanying payments. Moreover, in the case of the Contractor's failure to arrange in a satisfactory manner for maintenance work to be carried out, the Engineer shall arrange for it to be done by others at the Contractor's expense.

- .3 For maintenance work during construction, reference is to be made to the relevant provisions herein and hereinafter on clearing and cleaning up and reinstatement of work.
- .4 The Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the warranty period described in the General Conditions of this Contract.

1.47 GUARANTEES

- .1 Guarantee all construction work for one (1) year from the date of completion, or from the date when all deficiencies have been rectified whichever occurs later. Guarantee against failure due to faulty design, workmanship, materials, or failure to achieve specified operating conditions, or other conditions implied from data provided by the Engineer, or noted during the review of Shop Drawings.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

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

1.2 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Engineer based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

- .1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Engineer of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Engineer at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Engineer reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.

- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Engineer.
- .9 Touch-up damaged factory finished surfaces to Engineer's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.6 MANUFACTURER'S INSTRUCTIONS

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

1.7 QUALITY OF WORK

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

1.8 CO-ORDINATION

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

1.9 CONCEALMENT

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

1.10 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

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

1.12 FASTENINGS

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

1.13 FASTENINGS - EQUIPMENT

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

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Engineer, at no increase in Contract Price or Contract Time.
- .2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Engineer.

1.15 EXISTING UTILITIES

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.

1.2 SUBMITTALS

- .1 Submit written request and obtain Engineer's approval in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with "ULC approved" firestopping material, full thickness of the construction element.

- .11 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .12 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Procedures for demonstration and instruction of equipment and systems to Owner's personnel.

1.2 DESCRIPTION

- .1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.
- .2 Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.3 QUALITY CONTROL

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.4 SUBMITTALS

- .1 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Engineer's approval.
- .2 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .3 Give time and date of each demonstration, with list of persons present.

1.5 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation.
- .2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 00 - Commissioning and equipment and systems are fully operational.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.6 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.7 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the designated location.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.

- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 General requirements for Commissioning facilities and facility systems.

1.2 QUALITY ASSURANCE

- .1 Provide all related Commissioning and testing services.
- .2 Comply with applicable procedures and standards.
- .3 Perform services to support quality management and verifying contract performance.

1.3 REFERENCES

- .1 CSA Z320 – Building Commissioning Standard
- .2 ASHRAE Guideline 0-2013 – The Commissioning Process
- .3 ASHRAE Standard 202-2013 – Commissioning Process for Building and Systems

1.4 METHODOLOGY

- .1 Verification of performance of building systems and components will be performed by means of a Commissioning process.
- .2 Commissioning plan & testing activities shall be performed by the Contractor and witnessed by the Commissioning Agent.
- .3 Commissioning Agent for this facility will be the Owner's representative.

1.5 COMMISSIONING OBJECTIVES

- .1 To bring mechanical, electrical & building architectural systems and components from a state of static completion to a state of dynamic operation.
- .2 To verify conformance to contract requirements.
- .3 To confirm installations, meet requirements of performance specification & design intent of contract drawings and specifications.
- .4 To provide all testing documentation and records.
- .5 To ensure completed facility meets user stated requirements.
- .6 To provide a documented operator training program.
- .7 To verify accuracy of project record drawings and operating & maintenance manuals.

1.6 CONTRACTORS - COMMISSIONING PLAN

- .1 Provide a commissioning plan consisting of:
 - .1 Details regarding roles and responsibilities during all phases of Commissioning.
 - .2 Documentation defining design assumptions and performance standards of proposed systems.

- .3 Description of mechanical, electrical and building architectural systems, intended operation and performance details.
- .4 Static testing and verification procedures.
- .5 Functional performance verification procedures.
- .6 Contractors and manufacturers start-up reports.
- .7 Check sheet documentation for recording testing procedures and recording test results prepared by the Contractor for mechanical, electrical and building architectural systems and components.
- .8 Test procedures and documentation for seasonal or deferred commissioning.
- .9 Training plan for building operators.
- .10 Final commissioning report.

1.7 COMMISSIONING AGENT'S - RESPONSIBILITIES

- .1 For ensuring that commissioning activities are carried out in accordance with the Contractors Commissioning plan.
- .2 Commissioning Agent will:
 - .1 Chair and arrange commissioning meetings.
 - .2 Witness all equipment start-up and collect all manufacturer's start-up reports.
 - .3 Witness testing and balancing measurements and procedures.
 - .4 Witness all tests and initial all test documents at time of test.
 - .5 Co-sign off, as witness, all systems verification and test forms.
 - .6 Coordinate building operators training.
 - .7 Arrange for provision of additional training where required.
 - .8 Turn over completed Interim and Final Commissioning reports to the Owner's Representative.

1.8 CONTRACTORS - SUBMITTALS

- .1 Prior to start of Work, submit name of Contractor personnel proposed to perform services to organize, coordinate, and schedule the applicable personnel to complete the Commissioning process.
- .2 Submit documentation to confirm Contractor personnel compliance to perform services.
- .3 Contractor shall prepare & submit a completed Commissioning Plan and Commissioning Schedule for review by the Commissioning Agent four (4) weeks after award.
- .4 Submit an updated Commissioning Schedule as directed by the Commissioning Agent.
- .5 Prior to the Issuance of the Final Certificate of Completion, and within ten (10) working days after the issuance of the Interim Certificate of Completion, submit three (3) copies of the Interim Commissioning report in D-ring binders, complete with index tabs.
- .6 Submit reports of Commissioning activities that are deferred or seasonal after completion and witnessing by the Commissioning Agent.

1.9 PROCEDURES - GENERAL

- .1 Comply with referenced standards and the contract documents.
- .2 Notify Engineer fourteen (14) days prior to beginning Commissioning activities.

- .3 Accurately record data for each step on check sheets prepared by the Contractor.
- .4 Report to Commissioning Agent / Engineer any deficiencies or defects found during start-up and the solution to resolve.

1.10 CONTRACTORS - RESPONSIBILITIES

- .1 Prepare each system for testing and functional performance verification.
- .2 Cooperate fully with the Commissioning Agent in the execution of the Contractors Commissioning plan. At completion of Commissioning, provide a written statement affirming that building systems are operating properly in accordance with requirements of performance specification and design intent of contract drawings and specifications.
- .3 Provide personnel, equipment, instruments & operate systems as required to perform and record Commissioning activities as directed by the Commissioning Agent.

1.11 CONTRACTORS - PREPARATION

- .1 Contractors personnel and equipment are on-site to complete the scheduled activities.
- .2 All testing procedures & data recording check sheets are updated and on-site.
- .3 Contractors & Manufacturers Start-up reports are updated and on-site.
- .4 Updated Shop Drawings are on-site.
- .5 Equipment Installation, Operation & Maintenance Manuals are on-site.

1.12 SYSTEMS TO BE COMMISSIONED

- .1 The Contractor shall provide Commissioning services for the pivot gate, accessories and components.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 12 16.01 - Asphalt Paving Short Form

1.2 MEASUREMENT PROCEDURES

- .1 Removal of existing asphalt pavement will be measured in square metres of surface actually removed. Grinding of joints will be incidental to this work.
- .2 Payment under this item will include operations involved in removing, hauling and disposing of designated pavement and cleaning of remaining pavement surface.

Part 2 Products

2.1 CONSTRUCTION EQUIPMENT

- .1 General: Cold milling, planning, or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of paving surface to depths or grades indicated.
- .2 Paving-Cutting Equipment: Suitable mechanical sawing equipment or paving milling equipment capable of producing a straight, clean vertical face.

Part 3 Execution

3.1 EXAMINATION

- .1 Conduct a site review, with the engineer to verify locations, extent, and depths of asphalt designated for removal and items to remain.
- .2 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Engineer at no additional cost.

3.2 PREPARATION

- .1 Maintain public traffic.

3.3 REMOVAL - GENERAL

- .1 Remove paving to extents, lines, and grades indicated on the Drawings.
- .2 Cut paving to depth indicated on the Drawings.
- .3 Modify removal operations as required to prevent or eliminate impact damage or excessive vibration.
- .4 Control dust, erosion, and sediment.

3.4 FINISH TOLERANCES

- .1 Finish surfaces in areas where paving has been removed within ± 5 mm of grade specified but not uniformly high or low.

3.5 CLEANING

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA O121-M1978(R2003), Douglas Fir Plywood.
 - .3 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .4 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.
 - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
- .2 Tubular column forms: round, spirally wound laminated fibre forms, internally treated with release material.
- .3 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .4 Form release agent: non-toxic, biodegradable, and low VOC.
- .5 Falsework materials: to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Engineer approval for use of earth forms framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Do not place shores and mud sills on frozen ground.

- .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .7 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .8 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .9 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.
- .10 When slip forming is used, submit details of equipment and procedures for Engineer's approval.

3.2 REMOVAL AND RESHORING

- .1 Remove forms so that no damage occurs to the concrete.
- .2 Consider the location, character of the structure, weather and other conditions influencing the curing of concrete, in determining the time for removal of forms. Refer to Section 03 30 00 - Cast-in-Place Concrete.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 – Cast-in-Place Concrete.
- .2 Section 11 12 00 - Parking Control Equipment
- .3 Section 33 65 73 - Concrete Encased Duct Banks

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A 775/A 775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .2 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop drawings:
 - .1 Indicate placing of reinforcement, bar-bending details, bar schedule, quantities of reinforcement, sizes, spacings, locations of reinforcement splices (with identifying code marks to permit correct placement without reference to structural drawings).
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
 - .3 Provide shop drawings showing rebar reinforcement for snow and ice removal equipment concrete foundation and gate operator concrete pad for review and approval by Engineer. Shop drawings are to be stamped by a professional engineer licensed in the Province of Ontario.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with supplier's recommendations.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .2 Cold drawn annealed steel wire ties: to CSA G30.3.
- .3 Welded steel wire fabric: to CSA G30.5, provide in flat sheets only,
- .4 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.
- .5 Chairs, bar supports and spacers to CAN/CSA A23.1
- .6 Injectable adhesive shall be hybrid adhesive formulated to include resin and hardener to provide optimal curing speed as well as high strength and stiffness. Adhesive type to be approved by Engineer hybrid prior to use.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada
- .2 Location of reinforcement splices other than those shown on placing drawings only if permitted by Engineer.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Upon request inform Engineer of proposed source of material to be supplied.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Engineer.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars that develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated, as per approved shop drawings and in accordance with CSA-A23.1.
 - .1 Place reinforcing steel for Parking Control Equipment (Vertical Gate) foundations and footings in accordance with manufacturer requirements and approved shop drawings.
- .2 Clean reinforcing steel bars prior to placing concrete.
- .3 Welding of reinforcement will not be permitted.

- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Notify Engineer to permit inspection after placement is completed. Reinforcing for all concrete pours shall be inspected and approved after placing and prior to placing concrete.

3.3 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.
- .2 After reinforced concrete roadway removal (east of Building O-95), contractor to coat exposed reinforcing steel with either epoxy or zinc-rich paint prior to installing new asphalt pavement structure.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Requirements.
 - .1 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing
- .3 Section 11 12 00 Parking Control Equipment.

1.2 REFERENCES

- .1 Abbreviations and Acronyms:
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .1 Type GU, GUb and GUL - General use cement.
- .2 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C 260/C 260M-[10a], Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C 494/C 494M-[10a], Standard Specification for Chemical Admixtures for Concrete.
 - .3 ASTM D 1751-[04(2008)], Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .2 CSA International
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-[06], Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-[08], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 Ontario Provincial Standard Specification:
 - .1 OPSS Muni 351 Construction Specification for Concrete Sidewalk
 - .2 OPSS Muni 904 Construction Specification for Concrete Structures
 - .3 OPSS Muni 1315 Material Specification for White Pigmented Curing Compounds for Concrete
 - .4 OPSS Muni 1350 Material Specification for Concrete – Materials and Production

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Requirements.
- .2 Prior to commencing construction, submit mix design to the Engineer for review.
- .3 Upon request from the Engineer, Contractor to provide completed Concrete Release Pouring Form to Engineer for review and approval. Engineer to provide Concrete Release Pouring Form.
- .4 Minimum 2 weeks prior to starting concrete work submit to Engineer manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Blended hydraulic cement.
 - .3 Supplementary cementing materials.

- .4 Grout.
- .5 Admixtures.
- .6 Aggregates.
- .7 Water.
- .8 Waterstops.
- .9 Waterstop joints.
- .10 Joint filler.
- .5 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .6 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1
- .7 At least 2 weeks prior to starting concrete work, upon request provide Engineer with samples of aggregates and cement to be used.
- .8 Provide testing results and reports for review by Engineer and do not proceed without written approval when deviations from mix design or parameters are found.
- .9 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .10 Concrete hauling time: provide for review Engineer deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY ASSURANCE

- .1 Minimum 2 weeks prior to starting concrete work, provide proposed quality control procedures for review by Engineer on following items:
 - .1 Hot weather concrete.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
- .2 Quality assurance inspection or testing by the Engineer will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

Part 2 Products

2.1 MATERIALS

- .1 Portland Cement: to CSA A3001.
- .2 Supplementary cementing materials: to CSA A3001.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1/A23.2. Coarse aggregates to be normal density. Aggregates in accordance with Section 31 05 16 - Aggregate Materials.
- .5 Admixtures:

- .1 Air entraining admixture: to ASTM C 260.
- .2 Chemical admixture: to ASTM C 494. Engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Curing compound: to CSA A23.1/A23.2 white and OPSS 1315.
- .7 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D 1751.

2.2 MIXES

- .1 Proportion concrete in accordance with CAN/CSA-A23.1/A23.2 and as per the following criteria:
 - .1 Chain Link Fencing Footing:
 - .1 Concrete shall be according to OPSS 1350 with a nominal 28-Day compressive strength of 32 MPa (minimum)
 - .2 Class of exposure: C-2
 - .2 Concrete for steel bollards:
 - .1 Concrete shall be according to OPSS 1350 with a nominal 28-Day compressive strength of 25 MPa (minimum)
 - .3 Concrete Encased Duct Bank:
 - .1 Concrete shall be according to OPSS 1350 with a nominal 28-Day compressive strength of 20 MPa (minimum)
 - .4 Concrete Pads for Electrical Enclosures (Vehicle Parking Lot):
 - .1 Concrete shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa
 - .5 Vehicle Gate Operator Foundations and Footings:
 - .1 Concrete and reinforcing for gate operator foundation/pads and footings to be provided by the manufacturer. Contractor to provide shop drawings to Engineer for review and approval in accordance with Section 11 12 00 Parking Control Equipment.
 - .1 At minimum, concrete shall have a nominal 28-Day compressive strength of 35 MPa (minimum) and be Exposure Class C-1
- .2 Any changes to the mix design must be reviewed and approved by the Engineer.
- .3 If there is a change in the material source, a new mix design must be submitted to the Engineer for review.

Part 3 Execution

3.1 GRANULAR BASE/SUBGRADE PREPARATION

- .1 Chain Link Fencing Post Footing: pour concrete footing on undisturbed subgrade.
- .2 Concrete encasement for direct buried light pole: pour concrete on undisturbed subgrade
- .3 Concrete for steel bollards: Compact 300mm granular A base to 100% standard proctor maximum dry density.
- .4 Concrete Pads for Electrical Enclosures: Compact 150mm granular A base to 100% standard proctor maximum dry density.
- .5 Vehicle Gate Operator Pads/Foundations and Footings: per manufacturer requirements

3.2 CONCRETE PREPARATION

- .1 Obtain Engineer's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 During concreting operations:
 - .1 Development of cold joints is not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .3 Pumping of concrete is permitted only after approval of equipment and mix.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Prior to placing of concrete obtain Engineer's approval of proposed method for protection of concrete during placing and curing.
- .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .7 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .8 Do not place load upon new concrete until authorized by Engineer.

3.3 INSTALLATION/APPLICATION

- .1 Concrete works to be completed before the winter season.
- .2 Sidewalk and curb and gutter construction in accordance with OPSS 351 and Section 32 16 15 – Concrete Walks, Curbs and Gutters.
- .3 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .4 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
 - .3 Provide broom finish for walking surfaces unless otherwise indicated.
 - .4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.
- .5 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Engineer. When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .2 Locate and form expansion joints in accordance with OPSS 351.
 - .3 Install joint filler.
- .6 Cure and protect concrete in accordance with CSA-A23.1 and in accordance with OPSS 904.
- .7 Forms shall not be removed until removal operations will cause no damage to concrete surfaces.
- .8 Vehicular traffic, including construction equipment, shall be restricted from crossing the sidewalk after the concrete has been placed until the concrete has attained 20MPa. Concrete test cylinders

shall be cast for early strength determination to determine the concrete has obtained the required strength.

- .9 Vehicle gate operator concrete pads/foundations and footings to be constructed as per gate operator manufacturer recommendations and dimensions:
 - .1 Install concrete pad/foundation to a minimum depth of 1.5m below finished grade.
 - .2 Install rebar/steel reinforcing as per gate operator manufacturer recommendations, approved shop drawings and Section 03 20 00 - Concrete Reinforcing.

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Air and concrete temperature.
 - .5 Compressive strength at 7 and 28 days.
- .2 Testing Frequency: For all concrete, quality control testing consisting of slump, air content, and temperature determinations shall be carried out on each load or batch of concrete until satisfactory control is established.
 - .1 Control is established when concrete from 3 consecutive loads or batches meets performance requirements of concrete as established in PART 2 - PRODUCTS.
 - .1 After satisfactory control is established, testing shall be carried out on every third load.
 - .2 Satisfactory control shall be established each day.
- .3 Compressive Strength Cylinders:
 - .1 One set of 4 cylinders must be cast for every 20 m³ of concrete placed, with a minimum of one set per day.
 - .2 A set of cylinders for concrete made with aggregate of nominal maximum size larger than 19 mm shall consist of two 150 mm diameter x 300 mm long cylinders. For all other concrete, a set of cylinders shall consist of three 100 mm diameter x 200 mm long cylinders.
 - .3 One test cylinder must be tested for 7-day compressive strength, two test cylinders must be tested for 28-day compressive strength. The final cylinder will be tested at 56 days if required by the Engineer.
- .4 Inspection and testing of concrete and concrete materials shall be carried out by an independent Certified Testing Laboratory, approved by the Engineer, in accordance with CAN/CSA-A23.1 & A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .6 Contractor shall be responsible for all costs associated with quality control testing.

3.5 CLEANING

- .1 Clean in accordance with Section 01 00 10 – General Requirements.
- .2 Provide appropriate area on job site where concrete trucks can be safely washed.

- .3 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .4 Prevent admixtures and additive materials from entering drinking water supplies or streams.
- .5 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing
- .3 Section 03 30 00 - Cast-in-Place Concrete
- .4 Section 26 05 00 – Common Work Results for Electrical
- .5 Section 28 13 00 - Access Control
- .6 Section 32 31 13 - Chain Link Fences and Gates
- .7 Section 33 65 76 - Direct Buried Underground Cable Ducts.

1.2 REFERENCES

- .1 ASTM A 53/A 53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.
- .3 CAN/CSA-C22.2 No. 247 Operators and Systems of Doors, Gates, Draperies, and Louvers
- .4 CAN/CGSB-138.1-[96], Fabric for Chain Link Fence.
- .5 CAN/CGSB-138.2-[96], Steel Framework for Chain Link Fence.
- .6 CAN/CGSB-138.3-[96], Installation of Chain Link Fence.
- .7 CAN/CGSB-138.4-[96], Gates for Chain Link Fence.
- .8 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
- .9 CSA C22.2 NO 247 - Operators and systems of doors, gates, draperies, and louvres
- .10 UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Ontario. Shop drawings are to include the gate operator, concrete pad and foundation/footings (concrete mix and rebar design).

- .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.
- .5 Provide closeout documents and operation and maintenance (O&M) manuals as identified in Section 01 00 10 – General Requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

1.5 QUALITY ASSURANCE

- .1 Contractor to provide Gate Operator Manufacturer Qualifications: Minimum three (3) documented installations producing systems specified in this section.
- .2 Contractor to provide Installer Qualifications: An experienced installer who has completed fences and gates similar in material, design, and extent to those indicated for this project.

1.6 WARRANTY

- .1 Standard Warranty: Provide manufacturer's standard three (3) year warranty for system and system components against defective materials and workmanship after Date of Substantial Completion.

Part 2 Products

2.1 GATE OPERATOR FOUNDATION AND FOOTING

- .1 Contractor to submit concrete foundation and footing design from manufacturer for review and approval by the Engineer.

2.2 GATES

- .1 Material and Equipment in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Gates to be chain link fencing in accordance with Section 32 31 13 - Chain Link Fences and Gates, including mesh fabric and diagonal bracing. Dimensions as per:
 - .1 Height of mesh fabric: 1.8m as per details/drawings
 - .2 Gate width/opening: 6.0m
- .3 Vertical pivot gate: Gate Operator System listed to UL 325 Class III and CSA C22.2 No. 247. Gate panel: fabricated in accordance with ASTM F2200.
 - .1 Electronic vertical pivot gate system, or
- .4 Electronic vertical pivot gate system
 - .1 Gate Speed: Fully open to fully closed and fully closed to open in not less than 10-12 seconds.
 - .2 Frequency of Use: Continuous

- .3 Battery Powered Back Up DC Drive System: Operator to run on 24 Volt DC current integral power supply with stand-by battery system with built-in battery maintainer and "over-charge" protection.
 - .1 Field supplied: Provide two (2) 12V batteries, complying with gate operator manufacturer's requirements (Group 24, 12 Volt, Sealed Marine Starting).
 - .2 Power supply to operator: 120VAC (20 Amp).
- .4 Gate Operator Enclosure: Weather and rodent proof systems and enclosures
- .5 Mechanical Gate Operator Drive: 24 VDC high torque gear motor and DBL reduction DBL "V" belt design.
- .6 Control Circuitry: Solid state coated AutoGate Genesis® Control Board in electrical enclosure. Sealed gate position sensor ensure weather and moisture-proof integrity.
 - .1 Internal Operator Factory Wiring: 16 & 18 Ga. single conductor. Copper w/electrolytic copper compression terminals tin-plated for maximum corrosion prevention.
- .7 Protection Against Entrapment:
 - .1 Type A Entrapment Sensing Device - Operator shall have inherent gate position and speed sensing system as part of the gate operator system. Type A shall be constructed such that it may not be removed or bypassed.
 - .2 Type B1 (Non-contact sensor) or Type B2 (Contact sensor)
- .8 Operable in temperatures ranging from -40°C to +40°C
 - .1 Provide winter/cold weather package
 - .2 Provide heating equipment and associated wiring/conduits (as required) to ensure equipment is operable in -40°C weather
- .9 Safety:
 - .1 All entrapment areas/zones must be identified and have physical restrictions of pedestrian access (such as fencing or barrier screening) preventing reach through or standing in the entrapment zone, or the installer shall supply additional external entrapment protection devices to protect pedestrians in all entrapment areas.
 - .2 Provide external emergency stop button in an outdoor weather tight enclosure
- .10 Balance System: System designed to allow barrier to be hand raised and to be hand lowered with 12 to 15 pounds of pressure, consisting of manufacturer's standard cables, sheaves, sealed cam yoke roller bearings, and tension springs pulled in a straight line.
- .11 Electrical System:
 - .1 Wire: Oil and gasoline resistant.
 - .2 Overload Protection: Overload protection relay to protect motor.
 - .3 Reversing Controller: Provide as required to operate motor and solenoid valves.
 - .4 Overrun Delay Timers: Integral to board capable of shutting down system in case motor runs longer than 30 seconds.
 - .5 Limit Switches: Adjustable snap action style limit switches capable of stopping barrier at each end of travel.
 - .6 Logic Board: Programmable logic board with manufacturer's full range of available functions.
 - .7 All gates are equipped with a dry contactor to accommodate all types of access equipment.
- .12 Gate Operator Enclosure: Weather and rodent proof systems and enclosures

- .13 Protection Against Entrapment:
 - .1 Type A Entrapment Sensing Device - Operator shall have inherent gate position and speed sensing system as part of the gate operator system. Type A shall be constructed such that it may not be removed or bypassed.
 - .2 Type B1 (Non-contact sensor) or Type B2 (Contact sensor)
- .14 Operable in temperatures ranging from -40°C to +40°C
 - .1 Provide winter/cold weather package
 - .2 Provide heating equipment and associated wiring/conduits (as required) to ensure equipment is operable in -40°C weather
- .15 Safety:
 - .1 All entrapment areas/zones must be identified and have physical restrictions of pedestrian access (such as fencing or barrier screening) preventing reach through or standing in the entrapment zone, or the installer shall supply additional external entrapment protection devices to protect pedestrians in all entrapment areas.
 - .2 Provide external emergency stop button in an outdoor weather tight enclosure
- .5 Signage:
 - .1 Provide UL 325 compliant warning signs visible on each side of gate. Contractor to ensure signs are visible on both sides of the gate in both the open and closed positions.
- .6 Detector loop: in accordance with manufacturer recommendations to allow for free exiting of vehicles.
- .7 Access control system in accordance with Section 28 13 00 - Access Control

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Install electrical for system as detailed elsewhere in the specifications and on the drawings.
- .3 Construction gate operator concrete pads as per approved shop drawings.
- .4 Install detector loops in accordance with manufacturer recommendations.
- .5 Install gate operator in accordance with the manufacturer's instructions.
 - .1 Install vertical pivot gate system to provide rigid and secure installation as indicated, straight and true to lines and levels indicated, for free, easy operation.
 - .2 Install components square and level, accurately fitted and free from distortion and free from defects.
- .6 Connect gate to operator in accordance with gate manufacturer's instruction.
- .7 Install gate plumb and level when fully closed within the following tolerances:
 - .1 Maximum misalignment from true position: 6.0 mm.
 - .2 Maximum misalignment between adjacent separated members: 3.0 mm.

- .8 Adjust and lubricate operating components for smooth, accurate operation free of binding and racking
- .9 External Entrapment Sensing Device: Contractor shall be responsible for providing, installing, and testing all external entrapment protection devices as appropriate for the specific site conditions to protect pedestrians in all potential entrapment zones. Identifying all potential entrapment zones and the proper operation of these safety devices shall be verified and training as to the operation and maintenance of these devices for the users and owners shall be documented.

3.2 COMMISSIONING

- .1 Test, verify and commission in accordance with Section 01 91 00 - Commissioning.
- .2 Demonstration and Training: Conduct comprehensive demonstration for accommodation maintenance staff on operation and care of system in accordance with Section 01 79 00 - Demonstration and Training.

3.3 CLEANING AND PROTECTION

- .1 Clean installed products in accordance to manufacturer's recommendation.
- .2 Protect vertical pivot gate system from damage during remainder of construction operations; replace components damaged by subsequent construction operations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Definitions
 - .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications and on drawings, are those defined by IEEE SP1122.
- .2 Reference Standards:
 - .1 CSA Group
 - .1 CSA C22.1, Canadian Electrical Code, Part 1 (Current Edition), Safety Standard for Electrical Installations.
 - .2 CAN/CSA C22.3 No. 7-15, Underground Systems.
 - .3 CAN3-C235-83(R2015), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for electrical equipment and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Submit two (2) copies of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction.
 - .6 If changes are required, notify Engineer of these changes before they are made.
- .4 Certificates:
 - .1 Provide CSA Certified equipment and material.
 - .2 Where CSA certified equipment and/or material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of Contract.
 - .5 Submit, upon completion of work, load balance report as described in PART 3 – LOAD BALANCE.
 - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of work to Engineer.

- .5 Manufacturer's Field Reports: submit to Engineer manufacturer's written report, within 3 days of review, verifying compliance of work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data for electrical equipment for incorporation into manual.
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams and control sequence for each principle system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.
 - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
 - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect electrical equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.
- .4 Use one nameplate or label.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00 - Product Requirements.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATION SUBMITTALS.
- .3 Factory assemble control panels and component assemblies.

2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Verify installation and coordination responsibilities related to motors, equipment and controls, as indicated.

2.4 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of inspection authorities.

2.5 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.6 SINGLE LINE DIAGRAM

- .1 Provide single line electrical diagrams under plexiglass in ADM(IE) engineering and inside O95 main electrical room.

2.7 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicoid 3 mm, black face, white core, lettering accurately aligned and engraved into core, mechanically attached with self-tapping screws.
 - .2 Size as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters

Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Engineer prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.

2.8 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched through system.

2.9 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Prime	Auxiliary	
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Other Communication Systems	Green	Blue
Other Security Systems	Red	Yellow

2.10 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Engineer.
 - .2 Inform Engineer of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Engineer.

3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No. 1 except where specified otherwise.

3.3 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.4 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
 - .1 Sleeves through concrete: plastic, sized for free passage of conduit and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.5 COORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

- .1 Load Balance:
 - .1 Measure phase voltages at loads.
- .2 Conduct following tests:
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .4 Systems: Heat trace where applicable.
 - .5 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Engineer.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.7 TESTING

- .1 Testing firm shall provide all materials, equipment, labour and technical supervision to perform all tests and inspections mentioned in this specification.
- .2 Testing firm shall maintain a written record of all tests and upon completion of project assemble and certify a final test report.

3.8 SYSTEM STARTUP

- .1 Instruct Engineer operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

3.9 CLEANING

- .1 Cleaning: clean in accordance with section 01 00 10 – General Requirements.
 - .1 Leave work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-C22.2 No.18.1-13, Metallic Outlet Boxes (Tri-National Standard with UL514A and ANCE NMX-J-023/1).
 - .2 CAN/CSA-C22.2 No. 18.2-06(R2016), Non-metallic Outlet Boxes.
 - .3 CAN/CSA-C22.2 No. 18.3-04(R2009), Conduit Tubing and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 and UL 514B).
 - .4 CAN/CSA-C22.2 No. 18.4-15, Hardware for the Support of Conduit, Tubing and Cable (Bi-National Standard with UL 2239).
 - .5 CAN/CSA-C22.2 No.65-13(R2018), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE).
- .2 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations I clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Materials

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

- .3 Bushing stud connectors: to NEMA to consist of:
 - .1 Connector body and stud clamp for stranded copper conductors.
 - .2 Clamp for round copper conductors.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper bar.
 - .5 Sized for conductors and bars as indicated.
- .4 Clamps or connectors for armoured cable as required to: CAN/CSA-C22.2 No. 18.

Part 3 Execution

3.1 EXAMINATION

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 PRODUCT DATA

- .1 Provide product data in accordance with Section 01 00 10 – General Requirements.
- .2 Notify the Engineer in writing of any conflict between these specifications and manufacturer's instructions. The Engineer will designate which document is to be followed.

Part 2 Materials

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE, Non Jacketed.

2.2 TECK 90 CABLE

- .1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .3 Insulation:
 - .1 Cross-linked polyethylene XLPE.
 - .2 Rating: 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking galvanized steel.
- .6 Overall covering: thermoplastic polyvinyl chloride.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 50 mm centers.
 - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
 - .1 Watertight, approved for TECK cable.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

- .1 Install cable in trenches in accordance with Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .3 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .4 Conductor length for parallel feeders to be identical.
- .5 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .6 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
 - .2 In underground ducts in accordance with Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.

3.4 INSTALLATION OF ARMOURED CABLE

- .1 Group cables wherever possible on channels.
- .2 Install cable concealed, securely supported by straps.

3.5 INSTALLATION OF TECK 90 CABLE (0 – 1000 V)

- .1 Group cables wherever possible on channels.
- .2 Install cable exposed, securely supported by straps.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 IEEE 837-2014, Qualifying Permanent Connections Used in Substation Grounding.

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data for grounding equipment for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect grounding equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 EQUIPMENT

- .1 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.
- .2 Rod electrodes: copper clad steel 19 mm diameter by minimum 3 m long.
- .3 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .4 Insulated grounding conductors: green, copper conductors, size as indicated.
- .5 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.
- .6 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermite welded type conductor connectors.
 - .5 Bonding jumpers, straps.

- .6 Pressure wire connectors.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install bonding wire for flexible conduit, connected at one end to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .8 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
- .9 Install separate ground conductor to outdoor lighting standards.
- .10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .11 Ground secondary service pedestals.

3.3 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of secondary 208 V system.

3.4 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, distribution panels, outdoor lighting.

3.5 GROUNDING BUS

- .1 Ground items of electrical equipment in electrical rooms to new ground bus with individual bare stranded copper connections size 2/0 AWG.

3.6 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Requirements.
- .2 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Current Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Provide shop drawings: in accordance with Section 01 00 10 – General Requirements.

Part 2 Materials

2.1 JUNCTION AND PULL BOXES

- .1 Construction: welded steel enclosure.
- .2 Covers Flush Mounted: 25 mm minimum extension all around.
- .3 Covers Surface Mounted: screw-on turned edge covers.

Part 3 Execution

3.1 JUNCTION AND PULL BOXES INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.2 IDENTIFICATION

- .1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.
- .2 Identification Labels: size 2 indicating system name, source panel and circuit, and voltage and phase or as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Current Edition.
 - .2 CAN/CSA-C22.2 No.18.1-13, Metallic Outlet Boxes (Tri-National Standard with UL514A and ANCE NMX-J-023/1).
 - .3 CAN/CSA-C22.2 No. 18.2-06(R2016), Non-metallic Outlet Boxes.
 - .4 CAN/CSA-C22.2 No. 18.3-04(R2009), Conduit Tubing and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 and UL 514B.
 - .5 CAN/CSA-C22.2 No. 18.4-15, Hardware for the Support of Conduit, Tubing and Cable (Bi-National Standard with UL 2239).

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Requirements.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 One-piece electro-galvanized construction.
- .2 Single and multi-gang flush device boxes for flush and surface mount installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

2.3 FITTINGS – GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

2.4 SERVICE FITTINGS

- .1 'High tension' receptacle fitting made of 2 piece stainless steel with brushed aluminum housing finish for 1 duplex receptacles. Bottom plate with two knockouts for centered or offset installation.

Part 3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 18.1-13, Metallic Outlet Boxes (Tri-National Standard with UL 514A and ANCE NMX- J-023/1).
 - .2 CSA C22.2 No. 45.1-07(R2012), Electrical Rigid Metal Conduit – Steel (Tri-National Standard with UL 6 and NMX-J-534-ANCE-2007).
 - .3 CSA C22.2 No. 83-M1985(R2013), Electrical Metallic Tubing.
 - .4 CSA C22.2 No. 211.2-06(R2016), Rigid PVC (Unplasticized) Conduit.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Requirements.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

Part 2 Materials

2.1 CABLES AND REELS

- .1 Provide cables on reels or coils.
 - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.

2.2 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45.1, hot dipped galvanized steel threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .3 Rigid PVC conduit: to CSA C22.2 No. 211.2.

2.3 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
- .2 Two hole steel straps for conduits larger than NPS 2 50 mm.
- .3 Beam clamps to secure conduits to exposed steel work.
- .4 Channel type supports for two or more conduits at 1500 mm on center.
- .5 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18.1, manufactured for use with conduit specified. Coating: same as conduit.

- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

- .1 Polypropylene: 6 mm stranded, tensile strength 5 kN.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas.
- .3 Use rigid hot dipped galvanized steel threaded conduit where exposed to mechanical damage.
- .4 Use electrical metallic tubing (EMT) above 2.4 m not subject to mechanical injury.
- .5 Use rigid PVC conduit underground.
- .6 Use flexible metal conduit for work in movable metal partitions.
- .7 Minimum conduit size for lighting and power circuits: 19 mm.
- .8 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm diameter.
- .10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .11 Install fish cord in empty conduits.
- .12 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .13 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Locate to suit reinforcing steel.
 - .1 Install in center one third of slab.
- .2 Protect conduits from damage where they stub out of concrete.
- .3 Install sleeves where conduits pass through slab or wall.
- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.
 - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 25 mm concrete cover.
- .7 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits 25 mm and larger below slab and encase in 75 mm concrete envelope.
 - .1 Provide 50 mm of sand over concrete envelope below floor slab.

3.7 CONDUITS UNDERGROUND

- .1 Slope conduits towards electrical structures to provide drainage. Slope conduits away from buildings.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 00 10 – General Requirements.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Insulated Cable Engineers Association, Inc. (ICEA)
- .2 American National Standards Institute (ANSI) / International Electrical Testing Associate (NETA)
 - .1 ANSI/NETA ATS-2013, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 Install dynamometer on pulling equipment to monitor pulling tension. Monitor and record pulling tension frequently during pulling operation. Cease pulling if pulling tension approaches manufacturer's maximum allowable tension. Maximum tension: $t_m = 0.008 \times n \times \text{cmil}$, n = number of conductors, cmil = circular mill area of each conductor.
- .6 To facilitate matching of colour coded multi conductor control cables reel off in same direction during installation.
- .7 Before pulling cable into ducts and until cables are properly terminated, seal ends of cables with moisture seal tape.
- .8 After installation of cables, seal duct ends with duct sealing compound. Cap off all spare ducts.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using qualified personnel.
 - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds.
 - .1 Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests:
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V high voltage insulation tester on each phase conductor.

- .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests:
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .2 Ground shields, ground wires, metallic armour and conductors not under test.
 - .3 High Potential (Hipot) Testing.
 - .1 Conduct hipot testing in accordance with manufacturer's recommendations.
 - .4 Leakage Current Testing:
 - .1 Raise voltage in steps from zero to maximum values as specified by manufacturer for type of cable being tested.
 - .2 Hold maximum voltage for specified time period by manufacturer.
 - .3 Record leakage current at each step.
- .7 Provide Engineer with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Requirements.
 - .1 Leave Work area clean at end of each day.

3.4 PROTECTION

- .1 Repair damage to adjacent materials caused by cables installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CSA C22.2 No. 5-16, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2016).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Include time-current characteristic curves for breakers with ampacity of 100 A and over at system voltage.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store circuit breakers off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect circuit breakers from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Materials

2.1 BREAKERS GENERAL

- .1 Molded-case circuit breakers: to CSA C22.2 No. 5.
- .2 Bolt-on molded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers to have minimum symmetrical 10 kA rms interrupting capacity rating to match source panel 10 kA rms interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS

- .1 Molded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Install circuit breakers as indicated.

3.3 CLEANING

- .1 Clean in accordance with Section 01 00 10 – General Requirements.

END OF SECTION

PART 1 - GENERAL

1.1 References

- .1 CSA Group
 - .1 CAN/CSA-C22.2 No.4-04(R2014), Enclosed and Dead-Front Switches (Tri-National Standard, with ANCE NMX-J-162-2004 and UL 98).
 - .2 CSA C22.2 No.39-13, Fuseholder Assemblies.

1.2 Action and Informational Submittals

- .1 Submit in accordance with Section 01 00 10 – General Requirements
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for disconnect switches - fused and non-fused and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect disconnect switches - fused and non-fused from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Disconnect Switches

- .1 Non-fusible, disconnect switches in CSA enclosure CEMA 1 in the electrical room and CEMA 8, to CAN/CSA-C22.2 No.4 size as indicated.
- .2 Provision for padlocking in off switch position by 3 locks.
- .3 Mechanically interlocked door to prevent opening when handle in ON position.
- .4 Quick-make, quick-break action.
- .5 ON-OFF switch position indication on switch enclosure cover.

2.2 Equipment Identification

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

for Electrical.

- .2 Indicate name of load controlled on size 4 nameplate.

PART 3 - EXECUTION

3.1 Examination

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

3.2 Installation

- .1 Install disconnect switches.

3.3 Cleaning

- .1 Cleaning: clean in accordance with Section 01 00 10 – General Requirements
 - .1 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical
- .2 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings
- .3 Section 32 31 13 - Chain Link Fences and Gates

1.2 REFERENCES

- .1 Building Industry Consulting Service International (BICSI)
 - .1 Electronic Safety and Security Design Reference Manual (ESSDRM)
- .2 Canadian Standards Association (CSA)
 - .1 CSA-C22.1 (Latest Edition) Canadian Electrical Code, Part 1
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S301-09, Standard for Signal Receiving Centre Burglar Alarm System and Operations
 - .2 ULC-S318-96, Standard for Power Supplies for Burglar Alarm Systems.
 - .3 ULC-C634-86, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems.
- .5 Underwriters' Laboratories (UL)
 - .1 UL 294-2009, Access Control System Units.

1.3 DEFINITIONS

- .1 Abbreviations:
 - .1 Electronic Access Control (EAC): control of people through entrances and exits of controlled area. Security utilizing hardware systems and specialized procedures to control and monitor movements within a controlled area.
 - .2 IP: Internet Protocol.
 - .3 PIN: Personal Identification Number.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop drawings to indicate project layout:
 - .1 Indicate mounting heights and locations.
 - .2 Submit labelling system to identify all terminals, wiring conductors, device addresses and locations.
 - .3 Submit complete wiring diagrams and schematics.
 - .4 Submit complete equipment list.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .1 Submit ULC/cUL Product Safety Certificates.
 - .2 Submit verification Certificate that service/ installation company is ULC/cUL Listed.

- .3 Submit verification Certificate that service /installation company is an authorized manufactures installer.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
 - .1 Include:
 - .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Instructions of operation of equipment.
 - .4 Illustrations and diagrams to supplement procedures.
 - .5 Operation instructions provided by manufacturer.
 - .6 Cleaning instructions.

1.6 WARRANTY

- .1 For all installation and materials, the 12 month warranty period is extended to 36 months from final acceptance of the system.

Part 2 Products

2.1 MATERIALS

- .1 System Description:
 - .1 An Access Control System (ACS) is an Electronic System or network of integrated systems designed to control access and monitor events in a facility or campus. Access control is the physical process of controlling who can access an area and when, determined by what they have (an Access card, Long Range Reader), what they know (a PIN), and/ or something they are (biometrics).
 - .2 An ACS involves the control of people through entrances and exits of a controlled area. An aspect of security that utilizes hardware systems and specialized procedures to control and monitor movements into, out of, or within a controlled area. Access to various areas may be a function of authorized level or time or a combination or both.
 - .3 Each component of the system must be compatible with existing Verkada Security System.
 - .4 The ACS must include standard "off the shelf" equipment items available through at-least four full-service dealers to form a complete and operating system. Include: equipment cabinet(s), system power supply, junction box, gate control panels, gate activation units, electronic supervising master panel, system connectors, and system cables.
 - .5 Where access control equipment is installed outside, ensure equipment is weather and rodent proof with the ability to withstand the elements.
- .2 Intelligent Controllers
 - .1 Mount in appropriately sized cabinet for number of interface cards in system. Can be mounted in power supply cabinet.
 - .2 The intelligent controller shall provide decision making, event reporting, and database storage for hardware platform.
 - .3 The controller shall communicate with the host via on-board 10BaseT/100BaseTX Ethernet port. The Controller must able to communicate with or be able to be easily

- converted to fully communicate and be integrated with the existing Verkada Security System.
- .4 Two physical barriers shall be controlled. Each reader port shall accommodate a read head that utilizes Wiegand, magnetic stripe, or 2-wire RS-485 electrical signaling standards, one or two wire LED controls, and buzzer control.
- .5 Specifications
 - .1 Primary Power: twelve to twenty-four volts of direct current
 - .1 (12-24VDC) +/- 10%, 500mA maximum
 - .2 Communications Ports:
 - .1 Host Port 0: 10/100 Ethernet
 - .2 Host Port 1: RS-232
 - .3 Peripheral interface Port: RS-485, 2-wire
 - .3 Inputs:
 - .1 Eight general purpose - programmable circuit type
 - .2 Two dedicated: tamper and power monitor
 - .4 Outputs: Four relays – Form-C, 5 Amp, 30 volts direct current
 - .5 Readers Ports: Two reader ports
 - .1 Unregulated pass through (150 mA maximum) or regulated 12Vdc
 - .2 Signaling Clock and Data, Wiegand or 2-wire RS-485
 - .6 Keypad: Multiplexed with card data
 - .7 LED: Two-wire or one-wire bicolor support
 - .8 Buzzer: One-wire LED mode
 - .9 Temperature: zero to seventy degrees Centigrade (0-70° C) operational, -55 to 85 degrees Centigrade (-55 - 85° C) storage
 - .10 Humidity: ten to ninety-five percent (10 - 95%) relative humidity, non-condensing (RHNC)
 - .11 Standards: UL294/cUL , CE Compliant, ROHS,
- .6 Acceptable products: to be compatible with existing Verkada Security System.
- .3 Reader Interface
 - .1 Mount in appropriately sized gate pedestal.
 - .2 Specifications
 - .1 Primary Power:
 - .1 12-24VDC ±10%, 550mA maximum, plus Reader current
 - .2 12VDC at 450mA nominal, plus reader current
 - .3 24VDC at 270mA nominal, plus reader current
 - .2 Communication: 2-wire RS-485, 4,000 feet using Multi-Conductor - Low Capacitance Computer Cable for EIA RS-485 Applications
 - .1 Reader Interface: two reader ports, data card/keypad, clock/data, data-1/data-0, or 2-wire RS-485
 - .2 LED: one-wire bi-color LED support or two-wire
 - .3 Buzzer: one-wire LED mode
 - .3 Keypad: 8-bit Mercury, 8-bit Dorado, or 4-bit HID
 - .4 Reader Power:
 - .1 Pass through or 12Vdc regulated power, 125mA each reader
 - .5 Inputs: eight general purpose programmable type and two dedicated for tamper and power monitor
 - .6 Outputs: six relays – Form-C, 5 Amps at 28Vdc
 - .7 Temperature: 0 to 70 degrees Centigrade operational, -55 to 85 degrees Centigrade storage
 - .8 Humidity: 10-95 percent RHNC
 - .9 Standards: UL 294/cUL, CE compliant, RoHS
 - .3 Acceptable products: to be compatible with existing Verkada Security System.

- .4 Input Interface
 - .1 To be compatible with existing Verkada Security System.
- .5 Card and Keypad Readers
 - .1 Multi-technology contactless smart card readers shall read access control data from both 125 kHz and 13.56 MHz contactless smart cards. The multi-technology contactless smart card reader shall be optimally designed for use in access control applications that require reading both 125 kHz Proximity and 13.56 MHz contactless smart cards. Read Range:
 - .1 13.56MHZ smartcard: up to 10.2cm
 - .2 125MHZ proximity card: up to 9.0cm
 - .2 Mounting
 - .1 The reader shall be designed to mount and cover single gang switch boxes and mounted at 1200mm AFF on gate pedestal.
 - .3 Dimensions
 - .1 8.38cm x 12.2cm x 2.8 cm
 - .4 Power Supply
 - .1 5-16 VDC, Linear supply recommended.
 - .5 Current Requirements
 - .1 85mA Avg, 116mA peak @ 12VDC
 - .6 Operating Temperature
 - .1 -35° to 65°C
 - .7 Operating Humidity
 - .1 5% to 95% relative humidity non-condensing
 - .8 Dual authentication of identity supported through combined contactless card presentation and entry of personal identification number (PIN) through an integrated 12-key (3x4) keypad.
 - .9 Cable Distance
 - .1 Wiegand/Clock and Data Interface 150m, 22 AWG
 - .10 Certifications
 - .1 UL 294/cUL, FCC Certification, Canada Certification
 - .11 Acceptable manufacturers: HID RPK40 6136A, Honeywell OM55BHON, Lenel LNL-XF2110D
- .6 Long Range RFID Reader (LRRR) – 2 Required
 - .1 To be compatible with existing Verkada Security System.
 - .2 Minimum IP-64 housing or mount in appropriately sized gate pedestal.
 - .3 Operate in frequency bands 850 -960 MHZ.
 - .4 Maximum RF power 5 watts.
 - .5 Read Range - minimum 5m.
 - .6 Reads passive RFID technology
 - .7 Minimum Wiegand or RS-485or RS-232 communications or dry contact output to communicate with BACS.
 - .8 All required programming software, mounting kits, cables or accessories.
 - .9 RFID reader shall be mounted on appropriately sized gate pedestal.
 - .10 Acceptable Products: to be compatible with existing Verkada Security System.
 - .11 RFID VEHICLE TAGS – Required 200
 - .1 Tags shall be compatible with the Extra Long Range Reader.
 - .2 Tags shall be passive- no battery.
 - .3 Tags must be readily transferable, rear view mirror hangable or Interior windshield adhesive are the preferred methods of mounting.
- .7 Cables

- .1 Interface Communication Cable must be Multi-Conductor - Low Capacitance Computer Cable for EIA RS-485 Applications. 24 AWG stranded (7x32) TC conductors, polyethylene insulation, twisted pairs, overall foil (100% coverage) + TC braid shield (90% coverage), 24 AWG stranded TC drain wire, PVC jacket.
Acceptable Products: to be compatible with existing Verkada Security System.
- .2 Access Control Banana Peel cable must be 4 cable composite consisting of 3 shielded Multi-conductors, 1 shielded Multi-pair, Plenum rated
 - .1 Cable 1: 4-cond (W/Bk/R/Gn), 16 AWG stranded bare copper shield, Gray Jacket
 - .2 Cable 2: 3-Pair (WGn/OrBr/RBk), 18 AWG stranded bare copper shield, Orange jacket
 - .3 Cable 3: 2-cond (R/Bk), 18 AWG stranded bare copper shield, White jacket
 - .4 Cable 4: 4-cond (W/Bk/R/Gn), 18 AWG stranded bare copper shield, Blue jacket
- .3 Acceptable Products: to be compatible with existing Verkada Security System.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Install Access Control system and components in accordance with CAN/ULC-S302, BICSI and CEC.
- .2 Install access control pedestal/stands for vehicle gate access at a distance from the gates as recommended by the gate operator manufacturer and access control system manufacturer and as per drawings.
- .3 Install components in accordance with manufacturer's written installation instructions to locations, heights and surfaces shown on reviewed shop drawings.
- .4 Install required boxes in inconspicuous accessible locations.
- .5 Conceal conduit and wiring.
- .6 Arrange all network connectivity and system programming issues with Engineer and Verkada Security.

3.3 SITE TEST AND INSPECTION

- .1 Perform verification inspections and test in presence of Engineer and Verkada Security.
 - .1 Provide all necessary tools, ladders and equipment.
 - .2 Ensure appropriate manufacturer's representatives are present for verification.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Requirements
 - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning:
 - .1 Remove protective coverings from accessories and components.
 - .2 Clean housings and system components, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
 - .3 Clean components free from dirt and fingerprints.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Payment will be made for clearing and grubbing of areas noted on the contract drawings with separate items for tree removal (including grubbing) and tree trimming.

1.2 DEFINITIONS

- .1 Clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .2 Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments of less than 1.0m³ to not less than specified depth below existing ground surface or 0.3 m whichever is greater.

1.3 QUALITY ASSURANCE

- .1 Do construction occupational health and safety in accordance with MCA's General Conditions.
- .2 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, long sleeved clothing, eye protection and protective clothing when applying herbicide materials.
 - .2 Workers must not eat, drink or smoke while applying herbicide material.
 - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

1.4 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses and root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Engineer.
 - .2 Replace trees designated to remain, if damaged, as directed by Engineer.

Part 2 Products

2.1 MATERIALS

- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.
- .2 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Remove and store soil material for reused.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site and verify with Engineer, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Engineer immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Engineer in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.2 CLEARING

- .1 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.
- .2 Clear as indicated by Engineer, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 300 mm above ground surface.
- .3 Cut off branches and cut down trees overhanging area cleared as directed by Engineer.
- .4 Cut off unsound branches on trees designated to remain as directed by Engineer.

3.3 TREES

- .1 Cut trees as indicated by Engineer at height of not more than 300 mm above ground surface.
- .2 Grub out isolated tree stumps.
- .3 Trim individual trees along the existing/new fence lines to the vertical limit of 0.5m behind the fence.
- .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
- .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.

3.4 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 300 mm below ground surface.

- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 1.0 m³.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.5 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site.

3.6 FINISHED SURFACE

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 00 10 - General Requirements.
- .2 Section 02 41 13.13 - Pavement Removal
- .3 Section 26 05 00 - Common Work Results - Electrical.
- .4 Section 26 05 43.01 - Installation of Cables in Trenches and Ducts
- .5 Section 31 32 19.16 - Geotextile Soil Stabilization
- .6 Section 32 11 23 – Aggregate Base Courses.
- .7 Section 32 16 00 – Curbs, Gutters, and Sidewalks
- .8 Section 33 05 16 – Maintenance Holes and Catchbasin Structures
- .9 Section 33 65 76 - Direct Buried Underground Cable Duct.

1.2 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: solid material in excess of 1 m³ and which cannot be removed by means of heavy-duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .3 Waste material: Excavated material unsuitable for use in Work or surplus to requirements.
- .4 Borrow material: Material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
- .5 Recycled fill material: Material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.6 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136.

.2 Table:

<u>Sieve Designation</u>	<u>% Passing</u>
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 70% by mass passing 0.075 mm sieve.

.4 Materials deemed unsuitable by engineer

.7 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM C 117-17, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing

.2 ASTM C 136/C 136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

.3 ASTM D 422-63 2002, Standard Test Method for Particle-Size Analysis of Soils

.4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³)

.5 ASTM D 1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³)

.6 ASTM D 4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric

.3 CSA Group (CSA):

.1 CAN/CSA-A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005)

.1 CSA-A3001-18, Cementitious Materials for Use in Concrete

.2 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete

1.4 MEASUREMENT PROCEDURES

- .1 Earth and parking lot base excavation will be measured by the cubic meter based on plan quantity calculations.
- .2 Work performed under this Section will be incidental to work in Section 33 05 16 Maintenance Holes and Catchbasin Structures.
- .3 Rock excavation and disposal will be paid under the appropriate provisional item.
- .4 Removals of concrete items, chain link fences gates and associated equipment are per the appropriate pay item and are to be disposed of off-site by the contractor.
- .5 Electrical, communications, and grounding wiring for the exiting gate is to be removed and disposed of off-site.

Part 2 Products

2.1 MATERIALS

- .1 Granular A and Granular B fill: properties to Section 32 11 23 – Aggregate Base Courses.
- .2 Sand bedding: cables/ducts bedding and cover
 - .1 Mortar sand in accordance with OPSS Muni 1004, meeting physical properties and gradation requirements shown in Table 5 and Table 6 respectively
- .3 Type 3 fill: selected material from excavation or other sources, approved by Engineer for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .4 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum cement content of 25kg/m³.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: to CSA-A23.1/A23.2.
 - .5 Portland Cement: Type 10.
 - .6 Slump: 160 to 200 mm.
- .5 Geotextile soil stabilization: To Section 31 32 19.16 - Geotextile Soil Stabilization.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice, and snow from surfaces to be excavated within limits indicated.

- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13.13 – Pavement Removal.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .4 Protect buried services that are required to remain undisturbed.

3.2 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Contact MCA Department of the Environment for any additional requirements.
- .3 For trench excavation, unless otherwise authorized by Engineer in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .4 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Engineer.
- .5 Restrict vehicle operations directly adjacent to open trenches.
- .6 Dispose of surplus and unsuitable excavated material off site.
 - .1 Contractor to dispose of all surplus material and include cost to spread excess material at MCA identified site(s) within the St. Regis district in applicable contract items.
 - .1 Firstly, used as backfill material in trenches and/or to replace unsuitable materials.
 - .2 Secondly, offered to neighbouring property owners and leveled to a height of not more than 2m.
 - .3 Thirdly, disposed of off-site.
 - .2 Rock excavation is to be disposed of off-site.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .9 Notify Engineer when bottom of excavation is reached.
- .10 Obtain Engineer approval of completed excavation.
- .11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Engineer.
- .12 Correct unauthorized over-excavation as follows:

- .1 Fill under bearing surfaces and footings with Granular A fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.
- .13 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .14 If subsurface contamination is encountered, the Contractor will immediately notify the Contract Administrator for instructions on how to proceed. Contract Administrator reserves the right to adjust the contract schedule of work to mitigate delays. Contract Administrator will contact geotechnical consultant experienced in the removal of contaminated soil to develop a health and safety plan and method to address contamination. It is understood that the work required to address contaminated materials is not included in the current bid price.
- .15 If objects of archeological significance are discovered during any excavations, contractor to stop work in this area and request guidance from Contract Administrator. Contractor to immediately alter schedule to continue work in other areas of the contract. It is understood that the delay of work due to the discovery of archeological objects is not included in the current bid price.
- .16 Install geotextiles in accordance with Section 31 32 19.16 - Geotextile soil stabilization.

3.3 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated and as specified elsewhere.

3.4 BACKFILLING

- .1 Do not proceed with backfilling operations until Engineer has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfill containing large rocks or clumps are not to be placed within 600mm of pipe culverts.

3.5 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Engineer.
- .2 Clean and reinstate areas affected by Work as directed by Engineer.
- .3 Replace topsoil as directed by Engineer.

- .4 Reinstall pavement, sidewalks and lawns to elevation which existed before excavation, unless otherwise directed by the Engineer.
- .5 Regrade existing road ditch in accordance with Drawings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Supply and installation of geotextiles for roadway will be measured in square metres (m²) of surface covered. No allowance will be made for seams or overlaps.

1.3 REFERENCE STANDARDS

- .1 ASTM International (ASTM):
 - .1 ASTM D 3787-16, Standard Test Method for Bursting Strength of Textiles-Constant-Rate-of-Traverse (CRT) Ball Burst Test
 - .2 ASTM D 4491/D 4491M-22, Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - .3 ASTM D 4595-23, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Method
 - .4 ASTM D 4716/D 4716M-22, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
 - .5 ASTM D 4751-21a, Standard Test Method for Determining Apparent Opening Size of a Geotextile
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-4.2 No. 11.2-M89, Textile Test Methods - Bursting Strength - Ball Burst Test
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes
 - .1 No. 2-M85, Methods of Testing Geosynthetics - Mass per Unit Area
 - .2 No. 3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles
 - .3 No. 6.1-93, Methods of Testing Geotextiles and Geomembranes Bursting Strength of Geotextiles Under No Compressive Load
 - .4 No. 7.3-92, Methods of Testing Geotextiles and Geomembranes Grab Tensile Test for Geotextiles
 - .5 No. 10-94, Methods of Testing Geosynthetics: Geotextiles - Filtration Opening Size
- .3 CSA Group (CSA):
 - .1 CSA G40.20-13 /G40.21-13, General requirements for rolled or welded structural quality steel/Structural quality steel
- .4 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS 1860-2018, Material Specification for Geotextiles

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Submit the following action submittals minimum 1 week before starting work of this Section:
 - .1 Product data: Product literature and data sheets for geotextiles, including product characteristics, performance criteria, physical sizes, finishes, and limitations.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

Part 2 Products

2.1 MATERIAL

- .1 Non-woven to requirements of OPSS 1860.

Part 3 Execution

3.1 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Pin successive strips of geotextile with securing pins at 300 mm interval at mid-point of lap.
- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 Replace damaged or deteriorated geotextile to approval of engineer.
- .8 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.

3.2 PROTECTION

- .1 Protect installed geotextile material from displacement, damage, or deterioration before, during, and after placement of material layers.

- .2 Vehicular traffic is not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavation, Trenching, and Backfilling
- .2 Section 32 11 23 – Aggregate Base Courses

1.2 REFERENCE STANDARDS

- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 314-2023, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
 - .2 OPSS 1010 – 2025, Material Specification for Aggregates – Base, Subbase, Select Subgrade, Granular Surface, Shouldering, Bedding, and Backfill.

1.3 MEASUREMENT AND PAYMENT

- .1 Measure granular sub-base in tonnes of material incorporated into Work.

Part 2 Products

2.1 MATERIALS

- .1 Granular sub-base material to the following requirements:
 - .1 Granular B Type II to Ontario Provincial Standard Specification (OPSS) 314 and 1010.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation.

3.2 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by engineer.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Begin spreading sub-base material on crown line or high side of one-way slope.
- .6 Place granular sub-base materials using methods which do not lead to segregation or degradation.

- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .8 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
- .9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

3.3 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 98 % Standard Proctor density.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by engineer.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.5 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by engineer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01– Excavation, Trenching, and Backfilling
- .2 Section 32 11 16.01 - Granular Sub-base
- .3 Section 32 11 06 – Curbs, Gutters and Sidewalks

1.2 REFERENCE STANDARDS

- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 314-2023, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
 - .2 OPSS 1010 – 2025, Material Specification for Aggregates – Base, Subbase, Select Subgrade, Granular Surface, Shouldering, Bedding, and Backfill

1.3 MEASUREMENT AND PAYMENT

- .1 Measure granular base in tonnes of material incorporated into Work.

Part 2 Products

2.1 MATERIALS

- .1 Granular base to the following requirements:
 - .1 Granular A to Ontario Provincial Standard Specification (OPSS) 314 and 1010.

Part 3 Execution

3.1 PLACEMENT AND INSTALLATION

- .1 Place granular base after sub-base surface is inspected and approved in writing by engineer.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.

- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
- .4 Compacting:
 - .1 Compact to density not less than 98 % Standard Proctor density.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 11 23 - Aggregate Base Courses
- .2 Section 32 11 16.01 - Granular Sub-base
- .3 Section 32 16 00 – Curb, Gutters, and Sidewalks

1.2 REFERENCE STANDARDS

- .1 Asphalt Institute (AI)
 - .1 AI MS-2-1994, Mix Design Methods for Asphalt Concrete and Other Hot-Mixes.
- .2 ASTM International
 - .1 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 302-2012, Construction Specification for Primary Granular Base.
 - .2 OPSS 310-2012, Construction Specification for Hot Mixed Asphalt.
 - .3 OPSS 314-2004, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
 - .4 OPSS 1103-2012, Material Specification for Emulsified Asphalt.
 - .5 OPSS 1150-2010, Material Specification for Hot Mixed Asphalt.

1.3 MEASUREMENT AND PAYMENT

- .1 Measure asphalt concrete paving in tonnes of asphalt concrete actually incorporated into Work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10- General Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Aggregates to Section 32 11 23- Aggregate Base Courses and Section 32 11 16.01 Granular Sub-base.
- .2 Tack coat: SS-1 to OPSS 1103
- .3 Asphalt concrete: to OPSS 1150
- .4 Asphalt cement: penetration grade 85/100.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving.

3.2 FOUNDATIONS

- .1 Per Section 32 11 23 Aggregate Base Courses and Section 32 11 16.01 Granular Sub-base.
- .2 Construction of granular foundations: OPSS 314.
- .3 Compaction: compact each lift of granular material to 100% Standard Proctor density.

3.3 PAVEMENT THICKNESS

- .1 Pavements:
 - .1 Base course: 50 mm HL8
 - .2 Wear course: 40 mm HL3.

3.4 PAVEMENT CONSTRUCTION

- .1 Application of prime coat: OPSS 302
- .2 Construction of asphalt concrete: OPSS 310

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 Measurement and Payment:

- .1 Measure supply and application of calcium chloride in kilograms applied.
- .2 No extra compensation will be paid for calcium chloride ordered and applied on Saturdays, Sundays, or holidays.

1.2 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB):

- .1 CAN/CGSB-15.1-92, Calcium Chloride

Part 2 Products

2.1 MATERIALS

- .1 Calcium chloride, Type I: To CAN/CGSB-15.1, flake.

Part 3 Execution

3.1 APPLICATION

- .1 Apply calcium chloride when directed by engineer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 11 23 – Aggregate Base Courses
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 117-13, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136/C 136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM C 309 03, Liquid Membrane Forming Compounds for Curing Concrete.
 - .4 ASTM D 1751, Standard Specification For Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .5 ASTM D 698-12e2, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600 kN-m/m³).
- .2 CSA Group
 - .1 CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 2015.
- .3 Ministry of Transportation Ontario Standard Specifications
 - .1 OPSS 353 Concrete Curb and Gutter Systems – November 2021

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 00 10 – General Requirements.
- .2 Provide test results by accredited testing laboratory within previous 3 months and have passed tests equal to requirements of this specification. If tests are not available, contractor to provide and pay for current results for suitability of materials for this project.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials, Reinforcing steel, Joint filler, and Curing Compound in accordance with OPSS 353 – Concrete Curb and Gutter Systems.
- .2 Granular base: material to Section 32 11 23 - Aggregate Base Courses and following requirements:

- .1 Granular A

Part 3 Execution

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.2 CONCRETE, EXPANSION/CONTRACTION JOINTS, ISOLATION JOINTS AND CURING

- .1 Obtain Engineer's approval of granular base prior to placing concrete.
- .2 Do concrete work in accordance with OPSS 353 Concrete Curb and Gutter Systems.

3.3 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 12 16.01 – Asphalt Paving Short Form

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM E 1360 90 2000 e1, Standard Practice for Specifying Color by Using the Optical Society of America Uniform Color Scales System.
 - .2 ASTM D 4797 88-2004 Standard Test Methods for Chemical and Gravimetric Analysis of White and Yellow Thermoplastic Traffic Marking Containing Lead Chromate and Titanium Dioxide.
- .2 Environment Canada (EC)
 - .1 Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations, SOR/2009-264.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .4 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - [current edition].
 - .1 MPI #32, Traffic Markings Paint, Alkyd.
 - .2 MPI #97, Latex Traffic Marking Paint.

1.3 MEASUREMENT AND PAYMENT

- .1 Pavement marking: measured by lump sum.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

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

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Alkyd Traffic Paint and Markings:
 - .1 To MPI #32, Alkyd traffic marking meeting requirements of ASTM D 4797
 - .2 Traffic Marking Coatings: maximum VOC limit 450 g/L to GS-11 Standard
 - .3 Colour: to ASTM E 1360, yellow or white in accordance with MPI Architectural Painting Specification Manual
- .2 Thinner: to MPI listed manufacturer
- .3 Glass reflective beads: type suitable for application to wet paint surface for light reflectance.

Part 3 Execution

3.1 EXAMINATION

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

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.
- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

3.3 TRAFFIC CONTROL

- .1 In accordance with traffic control plan.

3.4 APPLICATION

- .1 Pavement markings: lay out pavement markings.
- .2 Unless otherwise approved by engineer, apply paint when air temperature minimum 10 degrees C, wind speed maximum 60 km/h and no rain forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m² /L.
- .4 Do not thin paint unless approved by engineer.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 0.5 kg/L of painted area immediately after application of paint.

3.5 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 11 12 00 - Parking Control Equipment
- .2 Section 28 13 00 - Access Control.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A 53/A 53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 90/A 90M-09, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 - .3 ASTM A 121-07, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
 - .4 A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM C 618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - .6 ASTM F 1664-08, Standard Specification for Poly(Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used with Chain-Link Fence.
 - .7 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.
- .2 Ontario Provincial Standard Drawings (OPSD)
 - .1 OPSD 972.101 Fence, Chain-Link, Component - Barbed Wire
 - .2 OPSD 972.102 Fence, Chain-Link, Component - Gate
 - .3 OPSD 972.130 Fence, Chain-Link, Installation - Roadway
 - .4 OPSD 972.132 Fence, Chain-Link, Details And Table
- .3 Ontario Provincial Standard Specification (OPSS).
 - .1 OPSS Muni 772 Construction Specification For Chain Link Fence
 - .2 OPSS Muni 1541 Material Specifications For Chain-Link Fence Components

1.3 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 concrete mixes, fences, posts and gates and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect fence and gate materials from damage.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete
- .2 Chain-link fence fabric: to CAN/CGSB-138.1 and in accordance with OPSS 772 and OPSS 1541 and as shown on drawings/details.
 - .1 Height of fabric: 1.8m
- .3 Posts, braces and rails: to CAN/CGSB-138.2 and in accordance with OPSS 772 and OPSS 1541 and as shown on drawings/details.
- .4 Tension wire: to CAN/CGSB-138.2, single strand, galvanized steel wire.
- .5 Tie wire fasteners: galvanized steel wire to OPSS 1541.
- .6 Tension bar: to ASTM A 653/A 653M, 5 x 20 mm minimum galvanized steel.
- .7 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
 - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
 - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
 - .3 Overhang tops to provide waterproof fit, to hold top rails and an outward projection to hold barbed wire overhang.
 - .4 Include projection with clips or recesses to hold 3 strands of barbed wire spaced 150 mm apart.
 - .5 Projection of approximately 300 mm long to project from fence at 45 degrees above horizontal.
- .8 Chain Link Fence Swing Gate: as indicated on drawings/details, 6m wide by 1.8m height
 - .1 Gates: to CAN/CGSB-138.4, and as per OPSD 972.102.
 - .2 Gate frames: to ASTM A 53/A 53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35 mm outside diameter pipe for interior bracing.
 - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
 - .2 Fasten fence fabric to gate with twisted selvage at top.
 - .3
- .9 Vertical Pivot Chain Link Fencing Vehicle Gates: as indicated on drawings/details, 5.0m wide gate openings.
 - .1 Gates: to CAN/CGSB-138.4, and as per OPSD 972.102.
 - .2 Gate frames: to ASTM A 53/A 53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35 mm outside diameter pipe for interior bracing.
 - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
 - .2 Fasten fence fabric to gate with twisted selvage at top.
 - .3 Access control: as per Section 28 13 00 - Access Control
 - .4 Gate Operators: as per Section 11 12 00 - Parking Control Equipment

Part 3 Execution

3.1 GRADING

- .1 Remove brush, debris and correct ground undulations along new fence line to obtain smooth uniform gradient between posts.
 - .1 Provide clearance between bottom of fence and ground surface of 30mm to 50mm at gates.

3.2 ERECTION OF FENCE

- .1 Erect fence along lines as indicated.
- .2 Excavate post holes to dimensions indicated.
- .3 Space line posts 3 m apart, measured parallel to ground surface.
- .4 Space straining posts at equal intervals not to exceed 150m if distance between end or corner posts on straight continuous lengths of fence over reasonably smooth grade, is greater than 150m.
- .5 Install additional straining posts at sharp changes in grade and where directed by Engineer.
- .6 Install corner post where change in alignment exceeds 10 degrees.
- .7 Install end posts at end of fence and at buildings.
 - .1 Install gate posts on both sides of gate openings.
- .8 Place concrete in post holes then embed posts into concrete to depths indicated.
 - .1 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .9 Install fence fabric after concrete has cured, minimum of 3 days.
- .10 Install brace between end and gate posts and nearest line post, placed in centre of panel and parallel to ground surface.
 - .1 Install braces on both sides of corner and straining posts in similar manner.
- .11 Install overhang tops and caps.
- .12 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
- .13 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .14 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
 - .1 Knuckled selvedge at bottom.
 - .2 Twisted selvedge at top.
- .15 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450 mm intervals.
 - .1 Give tie wires minimum two twists.

3.3 INSTALLATION OF GATES

- .1 Install gates in locations as indicated and as per manufacturer instructions.

- .2 Installation of all gates to be by qualified personnel.
- .1 Level ground between gate posts and set gate bottom approximately 40 mm above ground surface.
- .2 Determine position of centre gate rest for double gate.
 - .1 Cast gate rest into concrete.
 - .2 Slope upper concrete surface to drain water away from gate rest.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Requirements
 - .1 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 92 19.16 Hydraulic Seeding

1.2 REFERENCE STANDARDS

- .1 Agriculture and Agri-Food Canada:
 - .1 The Canadian System of Soil Classification, Third Edition, 1998
- .2 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA):
 - .1 Canadian Landscape Standard, second edition
 - .2 Canadian Nursery Stock Standard, 2017

1.3 MEASUREMENT PROCEDURES

- .1 Preparation of sub-grade for placing of topsoil will not be measured for payment.
- .2 Measure finish grading in square metres from actual surface measurements as determined by engineer.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for seeded 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 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 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.
 - .4 Consistency: Friable when moist.

2.2 SOURCE QUALITY CONTROL

- .1 Contractor is responsible for amendments to imported soils as specified.

Part 3 Execution

3.1 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify engineer and do not start work until instructed by engineer.
- .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 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.

3.2 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after engineer has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 100 mm.
- .3 Spread topsoil as indicated and to the following minimum depths after settlement.
 - .1 100 mm for seeded areas.
- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- .5 Avoid spreading or grading in wet, frozen, or saturated state.

3.3 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
 - .2 Leave surfaces smooth, uniform and firm against deep foot printing.

3.4 ACCEPTANCE

- .1 Engineer will inspect topsoil in place and determine acceptance of depth of topsoil and finish grading.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19.13 Topsoil Placement and Grading

1.2 MEASUREMENT AND PAYMENT

- .1 Measure hydraulic seeding square metre of actual surface area for:
 - .1 Grass mixture including fertilize.
 - .2 Areas of blending into existing turf grass will not be measured for payment.
- .2 Payment for seeding made at unit price bid of actual area surface measurements taken and computed by engineer.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, and fertilizer.
 - .2 Submit 2 copies of WHMIS MSDS.
- .3 Samples:
 - .1 Submit 0.5 kg container of each type of fertilizer used.
- .4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Fertilizer must be dry.
- .3 Storage and Handling Requirements:
 - .1 Store fertilizer in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Replace defective or damaged materials with new.

1.5 WARRANTY

- .1 For seeding, 12 months warranty period is extended to 1 full growing season.
- .2 Contractor hereby warrants that seeding will remain free of defects, for 1 full growing season.
- .3 End-of-warranty inspection will be conducted by Engineer.

Part 2 Products

2.1 GRASS SEED

- .1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
- .2 In packages individually labelled in accordance with "Seeds Regulations" and indicating name of supplier.

2.2 WATER

- .1 Free of impurities that would inhibit germination and growth.

2.3 FERTILIZER

- .1 To Canada "Fertilizers Act" and Regulations.
- .2 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

Part 3 Execution

3.1 EXAMINATION

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

3.2 SEED BED PREPARATION

- .1 Do not perform work under adverse field conditions as determined by Engineer.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

- .3 Verify that grades are correct. If discrepancies occur, notify Engineer and commence work when instructed by Engineer.
- .4 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of plus or minus 15 mm, surface draining naturally
- .5 Cultivate fine graded surface approved by Engineer to 25 mm depth immediately prior to seeding.

3.3 SEED PLACEMENT

- .1 For mechanical seeding:
 - .1 Use equipment and method acceptable to Engineer.
- .2 For manual seeding:
 - .1 Use manually operated drop seeder ("Cyclone" type or equivalent).
 - .2 Use manually operated, water ballast, landscaping type, smooth steel drum roller. Ballast as directed by Engineer.
 - .3 Use equipment and method acceptable to Engineer.
- .3 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
- .4 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .5 Incorporate seed by light raking in cross directions.
- .6 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Engineer with equipment approved by Engineer immediately after seeding.

3.4 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
 - .1 Clean and reinstate areas affected by Work.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by Engineer:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Engineer.

- .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
- .5 Adjust protection barrier as necessary to protect against deterioration due to pedestrian or other traffic as needed.

3.6 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted by Engineer provided that:
 - .1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .2 Areas have been cut at least twice.
 - .3 Areas have been fertilized.
- .2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period.
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to satisfaction of Engineer.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass.
 - .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33.01 – Excavating, Trenching, and Backfilling
- .2 Section 32 11 23 – Aggregate Base Courses

1.2 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A 48/A 48M-03(2012), Standard Specification for Grey Iron Castings.
 - .2 ASTM A 123/A 123M-2012, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM C 117-13, Standard Test Method for Materials Finer than 75-mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .4 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM C 139-11, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .6 ASTM C 478M-13, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
 - .7 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .3 CSA Group (CSA)
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A165 Series- [04(R2009)], CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
 - .3 CAN/CSA-A3000-[08], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .4 CSA G30.18-[09], Carbon Steel Bars for Concrete Reinforcement.
- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 407- [November 2007 -2010, Construction Specification For Maintenance Hole, Catch Basin, Ditch Inlet And Valve Chamber Installation.

1.3 MEASUREMENT PROCEDURES

- .1 Measure maintenance holes and catch basins in units including adjustments, frames and grates.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 00 10 – General Requirements
- .2 Shop Drawings:
 - .1 Submit drawings for precast units from recognized supplier or provide shop drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 00 10 – General Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location.
 - .2 Store and protect maintenance holes and catch basin structures from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Precast catch basin sections: to OPSD 705.030 – 2019.
- .2 Joints: made watertight using rubber rings, bituminous compound, epoxy resin cement or cement mortar.
- .3 Frames, gratings, covers to dimensions as indicated and following requirements:
 - .1 OPSD 403.010 – 2025.
- .4 Granular bedding and backfill: in accordance with Section 32 11 23 – Aggregate Base Courses and following requirements:
 - .1 Granular A.

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Obtain approval of engineer before installing maintenance holes or catch basins.

3.2 ADJUSTING OF EXISTING UNITS

- .1 Remove existing gratings, frames and store for re-use.
- .2 Adjustment units:
 - .1 Raise or lower frame and grate by adding or removing precast adjusters as required.
- .3 Frame and grates are to be flush with finished grade, with a maximum vertical tolerance of 10mm below finished grade, as measured in any direction with a 2.4m straight edge.
- .4 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base.
- .5 Make each successive joint watertight approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination of these materials.
- .6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .7 Clean units of debris and foreign materials.
 - .1 Remove fins and sharp projections.
 - .2 Prevent debris from entering system.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.2 QUALITY ASSURANCE

- .1 Quality assurance submittals submit:
 - .1 Certificates: signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

Part 2 Products

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: Type DB2/ES2, with moulded fittings, for direct burial Trade size 6.
 - .1 Nominal length: 6 m plus or minus 12 mm.
- .2 Rigid PVC split ducts.
- .3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make a complete installation.
- .4 Rigid PVC 90 degrees, 45 degrees bends and 5 degrees angle couplings as required.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

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

2.4 WARNING TAPE

- .1 Standard 4-mil polyethylene tape, red with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW".

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install duct in accordance with manufacturer's instructions and at elevations as indicated.

- .2 Clean inside of ducts before laying.
- .3 Install ducts on undisturbed soil or on well compacted granular fill not less than 150 mm thick, compacted to 100% of maximum proctor dry density. Maximum lift thickness of 150mm.
- .4 Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length.
- .5 Slope ducts with 1 to 400 minimum slope towards electrical structures and away from buildings.
- .6 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
- .7 Pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.
 - .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .8 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
- .9 Place continuous strip of warning tape 450 mm below finished grade before backfilling trenches.
- .10 Warning tape shall be entire width and length of duct bank.
- .11 Notify the DCC Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.
- .12 Granular 'A' backfill to be compacted to 100% maximum dry density in maximum 150mm lifts.

3.3 CLEANING

- .1 Clean in accordance with Section 01 00 10 – General Requirements.

END OF SECTION