SHEPARD DRIVE PARKING LOT

TOWN OF STRATFORD, PEI

TENDER DOCUMENTS
AND SPECIFICATIONS

MARCH 2026

END OF SECTION

SHEPARD DRIVE
PARKING LOT

TOWN OF STRATFORD

SPECIAL PROVISIONS
March 2026

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1. All correspondence and questions related to this work during tender shall be directed to WSP, 195 MacEwen Road, Summerside, PE, C1N 5Y4 or Telephone (902) 436-2669, or email colin.maceachern@wsp.com .

2. Bidders are advised that **no** trenches may be left open overnight.

3. It is the Owner's intention to reuse as much existing material as possible. If excavated material is deemed unacceptable by the Engineer, then there will be a requirement to remove excavated material from site and replace this material with good quality sandstone. Sandstone shall be composed of clean, uncoated particles free from lumps of clay or other deleterious materials of which no more than 15% shall pass a 75 um sieve and no material shall be retained on a 100 mm sieve.

   For the purpose of this project, the Contractor is allowed for fifty cubic meters ($50m^3$) of sandstone. There is a possibility that all or none of the above amount shall be utilized. There shall be no additional payment to the Contractor in either case as a result of quantity requirements. The price quoted shall include supply, placement and removal of unacceptable materials. Contractor must obtain permission from the Owner or Owner's Representative prior to placement and billing of provisional sandstone.

   All sandstone is to be compacted to 100% Standard Proctor Density.

4. Bidders are advised that no extras will be allowed for minor grade changes required due to conflicts exposed during excavation.

5. All requirements of the Town of Stratford and the PEI Department of Transportation & Infrastructure with regards to street blockage, construction barricades, flagpersons, etc., during construction will be the responsibility of the Contractor from the point of view of contact, coordination and cost.

   The successful contractor is to leave the name and number of a contact person with the local police department. This person will be contacted in the event of any problems arising at the site after hours or on the weekends.

6. Bidders are advised that a Certificate of Substantial Completion will only be issued following the Contractor successfully completing all required testing and reinstatement.

7. All excavated material that is considered unsuitable or excess by the Engineer will be the Contractor's property and is to be removed from the site. All disposal of material is the Contractor's responsibility (ie., disposal location, etc.). Any costs associated with the hauling and spreading of this material is considered incidental to the project. No extra will be allowed.

8. Bidders are advised that the Provincial Department of Transportation and Infrastructure has distributed a document titled, "Environment Protection Plan". The Contractor will be required to follow all items included in the above document in the course of the work.

   At a minimum the Contractor will be required to utilize the following Environmental Controls for all areas distributed adjacent to existing ditches.

   → Straw Check Dams
   → Dry Seeding
   → Hay Mulch

9. Bidders are advised that all grassed areas disturbed during construction, must be reinstated to the Engineer's approval. Work required will include topsoil placement, fine grading, fertilizer, seed (DOTIE mix), mulch (if required), and maintenance (ie., water, mowing, etc.) to full development of reinstated area as per Section 32 92 23 Topsoil, Seeding and Sodding. All grassed areas are to be hydroseeded and will require at least three cuttings as part of the maintenance during reinstatement. All costs associated with reinstatement is considered incidental to the work. No pay item has been detailed and no extra will be allowed.

10. a) The Tenderer shall fill in their own schedule showing the number of weeks of construction activity planned. Tenderers are advised that upon receipt of tenders and construction activity time, the authority will estimate construction costs for each Tenderer's submission dates. The completion of tenders submitted, plus estimated owner's construction costs, based on the Tenderer's completion time, will be considered in the award of tender. Construction costs for the purpose of evaluation only will be $2,000.00 per week.

    b) Extension of Time - An extension of time may be granted in writing by the Owner in the event of the work being delayed due to a change of scope in the work, a significant unit quantity increase, loss of production due to above average weather conditions, delays in material supplied by others and any other causes beyond the Contractor's control. Such extensions shall be for such time as the Owner may prescribe, and the Owner shall fix the terms on which the said extension may be granted. An application by the Contractor for an extension of time as herein provided shall be made to the Owner in writing prior to the end of the specified contract time. Where applicable, all bonds or other surety furnished to the Owner by the Contractor shall be amended where necessary at the expense of the Contractor to provide coverage beyond the date of any extension of time granted, and the Contractor shall furnish the Owner with evidence of such amendment of the bonds or other surety.

       Any extension of time that may be granted and accepted without prejudice to any rights of the Owner whatsoever under the Contract. All such rights shall continue to be in full force and in effect after the specified construction period.

    c) Liquidated Damages - The Contractor shall pay liquidated damages for each working day beyond the number of working days as specified in the Contract or beyond any extension of time that may be granted in accordance with 10(b) above.

The liquidated damages shall be equivalent to the costs incurred by the Owner for each day beyond the scheduled time of completion. All above monies shall be deducted from progress claims (ie., consultant fee, supervisor salaries, overhead vehicle cost, etc.).

11. Bidders are advised that project drawings are to be considered as a reasonable reflection of existing surface conditions only, and that underground conditions will vary and that non-detected or unforeseen items are to be expected (ie., unexpected buried pipes, excessive groundwater or rock, utilities lines, etc.). If existing conditions vary in such a manner as to severely impede progress or cause a complete halt to construction activities, notify the Site Engineer immediately for further direction.

    If it is deemed by the Site Engineer that alternations to existing features or revisions to the design are required, then the appropriate direction will be given to the Contractor and the required Change Orders are to be signed. The above process is expected to be completed within a time period of 48 hours, per occurrence, after notification to the Site Engineer (excluding weekends). The Contractor will be required to continue construction activities in other areas of the project site, so as to minimize the amount of down time. Costs related to down time will not be considered as an extra to the project under any circumstances. If approved down time occurs, the Contractor's construction schedule will be extended to reflect the appropriate time.

12. Bidders are advised that due to the nature of the job, all work must be conducted within the boundaries of the easements shown (UNO). Any damage done to the property outside the provided easement will be the Contractor's responsibility.

13. Bidders are advised that due to budgetary restraints the scope of the project may have to be diminished in total cost in order to meet available funding. The Owner reserves the right to reduce or omit any item as deemed necessary in order to meet budgetary restraints.

14. Bidders are advised that invoices for work performed must be received within one (1) month of receiving substantial completion. No invoices will be accepted beyond the above one-month period.

15. Materials testing will be the responsibility of the Contractor and must be performed in accordance with Section 01 45 00 of the project specifications.

16. Upon final inspection and testing if any part of any component of the project does not meet project specifications, then the following shall occur:

    (a) The Contractor shall immediately remove all components that do not meet project specifications and replace them with materials that do meet project specifications at no additional cost to the Owner; or,

    (b) The Contractor shall make arrangements with the Owner so as to satisfy the Owner that no short- or long-term negative consequences will occur as a result of the components not meeting specifications. If the Contractor cannot satisfy the Owner of these requirements, then all components that do not meet project specifications shall be removed and replaced by the Contractor at no additional costs to the Owner.

    (c) All costs associated with non-compliance with specifications, including testing materials, labour, and engineering will be the Contractor's responsibility.

17. Bidders are advised that the Contractor will be required to repair any trench settlement/heaving which occurs. If the settlement occurs within the limits of the asphalt within the Maintenance Guarantee Period, the Contractor will be required to perform all repairs to the satisfaction of the Engineer and the Town of Stratford. Also, the 5% Maintenance Guarantee will be held for one additional year after repairs have been made.

18. All asphalt and concrete to be sawcut prior to excavation. The Contractor will not be required to reinstate extreme thicknesses of asphalt. Reinstatement will be as per details in the contract drawings.

19. Bidders are advised that all construction activity, and equipment parked on site, must be barricaded with construction fence.

20. The Owner has applied to the Department of Transportation for Approval to Proceed on this project. Any changes required as a result of this Permit is to be incorporated into the Scope of Work. No work will be allowed to proceed until this Permit is issued and reviewed by the Contractor.

21. No extra work will be allowed to proceed without the execution of a Change Order, signed by the Town of Stratford or their representative and the Contractor, specifying work to be completed at a fixed cost for said work.

22. At all locations where new lines are installed into an existing system, all repair sleeves, etc., that may be required for a complete finished product to the Engineer's approval are to be incorporated into the work and will be considered incidental to fittings being installed. No extras will be allowed.

23. For the purposes of record drawings, the Contractor will be required to supply redline mark-up plans to the Engineer at the completion of the project and prior to final inspection (see section 01 78 00). All costs associated with the requirements of the above section are considered incidental to the project; however, no holdback monies will be released until all "Record Drawings" have been accepted by the Engineer and Town of Stratford.

24. At all locations where new manholes, catchbasins, sewer mains and storm mains are installed into an existing system, all transition sleeves, repair sleeves, jackhammering, grouting, etc., that may be required for a complete finished product to the Engineer's approval are to be incorporated into the work and will be considered incidental to the item being installed. No extra will be allowed.

25. Bidders are advised that all curb stops, valves, manholes, catch basins, etc. that are within the project limits must be adjusted where required to be flush with the surface and accessible upon completion of the work. The Contractor will be responsible for all components necessary to make the adjustment. This is considered incidental to the work and no extra will be allowed.

26. Bidders are advised that the Contractor will be responsible for maintaining all property pins and for identifying all property pins that may be required to be removed during construction. The Contractor must have the property owner locate pins that may not be visible and keep records identifying what pins have been located, not been located, and require to be removed. This information must be completed and submitted to the Town of Stratford prior to commencement of construction. Any pins removed must be replaced by a Land Surveyor at the Contractor's expense.

27. Bidders are advised that plans for the project have been submitted to Maritime Electric Company

Ltd. (MECL), Bell Aliant Ltd. and Eastlink. Bidders are advised to contact the following representatives with respect to the individual utility's infrastructure and requirements:

Utility	Contact Name	Telephone #
MECL	Mech\group-undergroundlocates @maritimeelectric.com	1-800-670-1012
Bell Aliant		
- Ch'town → East	Kyle Jordan	Kyle.Jordan@bellaliant.ca
	If required to survey, use Info Excavation	*1-800-663-9228*
Eastlink	Ontario.locates@corp.eastlink.ca	

28. Bidders are advised that the Contractor must employ and pay for the services of a Prince Edward Island Land Surveyor to provide project layout and record drawings (See Section 01 78 01). All costs associated with the requirements of the above section are considered incidental to the project; however, no holdback monies will be released until all "Record Drawings" have been received and accepted by the Engineer and the Owner.

29. Bidders are advised that if wet conditions are encountered in the trench excavation, it may be deemed necessary by the Engineer to use drainage gravel (including filter fabric) as bedding material rather than sand material as specified and shown in the details. For the purpose of this contract, it has been estimated that twenty-five cubic meters (25 m^3) of drainage gravel will be required. There is a possibility that all or none of this quantity will be utilized. There shall be no additional payment to the Contractor in either case as a result of quantity requirements. Per cubic meter payment will be full compensation for supply and placement of drainage gravel (including filter fabric) in accordance with Section 31 23 33.

30. Bidders are advised, prior to application for substantial completion, the Contractor will first be required to provide the Engineer with the complete certified materials testing report produced by the Contractor's materials testing firm.

31. Bidders are advised, proof rolling at parking lot and access is to be completed in the presence of the Contractor's geotechnical firm.

1 GENERAL

Sealed tenders for the work proposed shall be addressed to the Town of Stratford and plainly marked:

Shepard Drive
Parking Lot
Stratford, PEI

Tenders will be received by the Town of Stratford until the date and time specified in in the tender ad, at the Town Office located at 234 Shakespeare Drive, Stratford, PEI.

2 GOVERNING LAW

Federal and Provincial laws shall govern the interpretation and performance of any agreement with the Town of Stratford regarding this project. Any action brought to enforce any provision of an agreement shall be brought in the appropriate courts of the Province of Prince Edward Island. The parties understand and expressly agree that any claims, demands or actions asserted against the Town of Stratford, its Agents and Employees shall be brought only in the court system of the Province of Prince Edward Island.

3 TENDER DEPOSIT

Every Tender received shall be accompanied by a certified cheque, bank draft or bid bond payable to the Town of Stratford in the amount of at least Ten Percent (10%) of the tender price, including all applicable taxes. The bid guarantees will be returned to all, except the three lowest bidders, within three days after the opening of tenders. The bid guarantees of the remaining non-successful bidders will be returned within the earlier of 60 days after the opening of tenders and two days after Council awarding the tender. No interest will be paid on any tender deposit.

If a bid bond is issued it must be accompanied by a letter of surety from a recognized Canadian Surety Company outlining that a Fifty Percent (50%) Performance Bond and a Fifty Percent (50%) Labour and Materials Bond will be presented if awarded the project.

All other deposits shall be returned by mail unless otherwise requested by the Bidder.

4 INTERPRETATION OF CONTRACT DOCUMENTS

Should any person contemplating submitting a tender for the proposed Contract find discrepancies in or omissions from the drawings, specifications, or other parts of the contract documents, or should they be in doubt as to their true meaning, or if they require additional information concerning the scope of work or the manner in which it must be carried out, he/she may submit a written request to the Engineer for interpretation a minimum of two clear business days prior to tender closing. Any conflict between drawings, specifications and authoritative requirements, the most stringent interpretation will apply.

These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

5 WITHDRAWAL OR QUALIFYING OF TENDERS

A Bidder who has already submitted a tender may submit a further tender at any time up to the official closing time. The last tender received shall supersede and invalidate all tenders previously submitted by that Bidder for this Contract. Any Bidder may withdraw or qualify their tender at any time up to the official closing time by submitting a letter bearing his/her signature and seal as in their tender to the Owner the time and date of receipt will be marked thereon and the letter will be placed in the tender box. The new tender shall be marked on the sealed envelope by the Bidder as "Resubmission #" along with the name of the Bidder and to the attention of the Controller. Tenders may be withdrawn at any time prior to opening upon written request from the Bidder. Negligence on the part of the Bidder in preparing his/her tender shall not constitute a right to withdraw a tender subsequent to the tender opening.

No fax or email submission will be considered. All entries in the Form of Tender shall be made in ink or by typewriter. Entries and changes made in pencil shall, unless otherwise decided by the Owner, be invalid or informal.

6 INFORMAL OR UNBALANCED TENDERS

Tenders that contain prices which appear to be so unbalanced as likely to affect adversely the interests of the Owner may be rejected. Wherever, in a tender that amount tendered for an item does not agree with the extension of the estimated quantity and the tendered unit price, the unit price shall govern and the amount shall be corrected accordingly. If a Bidder has not entered a price for an item or work set out in the Form of Tender, he/she shall, unless it was specifically stated otherwise in their tender, be deemed to have allowed

elsewhere in the Form of Tender for the cost of carrying out the said item or work, unless agreed by the Owner no increase shall be made in the Total Tender Price on account of such omission.

7 EXAMINATION OF SITE

Each Bidder shall personally examine the location of the proposed work, and shall satisfy themselves by such other means as they may prefer as to the actual conditions and requirements under which the work shall be carried out.

No plea for ignorance of conditions that exist or that may hereafter exist or of conditions or difficulties that may be encountered in the execution of the work under this Contract as a result of failure to make the necessary examinations and investigations shall be accepted as an excuse for any failure or omission on the part of the Contractor to fulfil in every detail all the requirements of said Contract Documents or shall be accepted as a basis for any claim whatsoever for extra compensation or an extension of time.

The Bidder shall also make all the investigations necessary to thoroughly inform themself regarding all facilities for access to the site that they may require for storage and construction operation.

8 TENDER FORM

All submissions shall be upon the blank Form of Tender enclosed and be signed by the Bidder with their business address and place of residence. All blank spaces which pertain to the Tender submitted shall be filled in by typewriter, or legible printing in ink except signatures, which must be handwritten.

9 PRICE SUBMITTED

The amounts stated in the Tender Form shall include the furnishing of all materials, supplies and equipment and the providing of all labour, construction tools and equipment, utility and transportation services necessary to complete all the work required under this Contract whether specifically included in the Contract Documents or not. It is the intention of the Drawings and Specifications to provide finished work. Any items omitted therefrom which are clearly necessary for the completion of the work or its appurtenances shall be considered a portion of the work though not directly and/or shown or called for on the Drawings.

10 SUB-CONTRACTORS

The Bidders shall give in the Form of Tender the name and address of each proposed sub-contractor used in making up his tender as set out in the Tender Form. Only one sub-contractor shall be named for each part of the work to be sublet. The Town of Stratford reserves the right to accept or reject sub-contractors.

11 RIGHT TO ACCEPT OR REJECT TENDERS

Bidders are advised that:

The lowest or any particular bid will not necessarily be accepted.

The criteria to be considered by the Owner in awarding the contract will include a combination of price, scheduling, expertise, qualifications and such other conditions as may be determined by the Owner to be in its own best interests.

Additions, alterations, deletions or other irregularities in the bid form may, but will not necessarily, result in the Owner's rejection of the bid.

The bidder acknowledges that it shall have no claim against, or entitlement to damages from, the owner by reason of the Owner's rejection of its bid or of all bids.

12 CANCELLATION OF TENDER

The Owner reserves the right to cancel any request for tender at any time, without recourse by the Contractor. The Owner has the right to not award this work for any reason, including choosing to complete the work with the Owner’s [sic] own forces**.**

13 CONTRACT DEPOSITS

The Contractor must provide the following performance deposit: Certified cheque(s), or bank draft payable to the Town of Stratford in the amount of Ten Percent (10%) of the contract price, including applicable taxes, or a Performance Bond **and** a Materials and Labour Bond both in the amount of Fifty Percent (50%) of the contract price payable to the Town of Stratford. Deposit(s) shall be retained during the contract period until the issuance of the Final Certificate of Completion. Certified cheques and bank drafts will be held, uncashed, by the Owner and no interest will be paid. Performance deposit will be released upon Final Completion of the work to the Engineer's approval. A Fifteen Percent (15%) Holdback will be retained during construction and for Sixty (60) days following substantial completion as the Owner's protection during the standard lien period.

14 SCHEDULE

A detailed schedule of the work may be provided with the tender package and will be reviewed in conjunction to the tendered price and completion time during tender evaluation. If a detailed schedule is not submitted with the tender package, one must be provided prior to award.

15 SALES TAX

Contractor is to include all applicable Harmonized Sales Taxes (HST). It is the intention of the Owner to claim a credit for these taxes. Therefore, all information pertaining to taxes required by the Owner will be made available by the Contractor.

The HST shall be shown separately in the Schedule of Unit Prices in the provided space. This amount must be added to the subtotal to result in a total tender amount.

16 GUARANTEED MAINTENANCE PERIOD

A guaranteed maintenance period shall be effective for a total of twelve months, specified from the day following substantial performance of the work. Five percent (5%) of all monies shall be retained by the Owner during construction and for twelve (12) months following substantial performance of the work. This five percent (5%) shall be retained as security for the Owner to be utilized by the Owner if the Contractor fails to provide adequate service during the maintenance period. All engineering costs incurred by the Owner resulting from inadequate service by the Contractor (ie., non-responsive to deficient items requiring repair or repeated repairs to the same item), will be deducted from the Guaranteed Maintenance Holdback.

NOTE: Guaranteed Maintenance Holdback is in addition to the Fifteen Percent (15%) Mechanic's Lien Holdback.

17 ASSIGNMENT

This tender, and any resulting contract, may not be assigned by either party without the prior written consent and approval of the other party, which consent may not be unreasonably withheld; provided, however, either party, without such consent, may assign or sell the same in connection with the transfer or sale of substantially its entire business to which this contract pertains or in the event of its merger or consolidation with another company. Any permitted assignee shall assume all obligations of its assignor under this contract. No assignment shall relive any part of responsibility for the performance of any accrued obligation that such party then has hereunder.

18 ADDENDA

1. The Town of Stratford reserves the right at any time prior to the award of the Contract, to make changes and/or revisions that are considered altering the intent of this Tender. Any changes and/or revisions will be issued as an Addendum.

2. The Town of Stratford, in consultation with the Consultant, will review all questions and issue written instructions in the form of an Addendum, which will become part of the Contract documents. All Addenda must be acknowledged on the Form of Tender.

3. The closing date of the Request for Tender may be extended as deemed appropriate by the Town of Stratford.

4. It is a Bidder's sole responsibility to ensure that it has accounted for all Addenda or other notices of change or alteration of the Tender in their submission and in any price proposed therein. All Addenda will be posted at:

   https://www.princeedwardisland.ca/en/tenders and at
   www.townofstratford.ca

5. The Town of Stratford shall not be liable for any expense, cost, loss or damage incurred or suffered by any Bidder as a result of the publication of an Addendum or other notice.

TENDER FORM FOR

SHEPARD DRIVE
PARKING LOT

TOWN OF STRATFORD
STRATFORD, PEI

TO: TOWN OF STRATFORD
ATTENTION: CARTER LIVINGSTONE
234 SHAKESPEARE DRIVE
STRATFORD, PE
C1B 2V8

_____(Name of Tenderer) having carefully examined the site of the proposed works and all documents relating thereto, including the Form of Tender, Instructions to Bidders, General Conditions, Specifications, Drawings, and Addenda if applicable, accept and agree to the same as forming part and parcel of the Contract for the work described in these documents, and we the undersigned hereby tender and offer, in accordance with the said documents, to enter into a Contract with the Town of Stratford, defined as the Owner, within the time prescribed, to furnish all materials, labour, equipment, matters and things, and to do all work necessary to construct, complete and ready for use within the time stated, in strict accordance with the documents pertaining to the said Contract for the total sum of _____

_____ Dollars ($_____)

or such other sum as may be ascertained in accordance with the Contract. The aforesaid sum is made up as stated in appended Tender Price Breakdown forming part of this Tender and includes all costs, including but not limited to, Harmonized Sales Tax on materials to be incorporated into the work.

WE ENCLOSE HEREWITH: A deposit of Ten Percent (10%) of the tendered amount, including Harmonized Sales Tax, in the form of a certified cheque or bid bond issued by a Company licensed to carry on such business in Canada.

In the event of this tender being accepted within 60 days of the time stated for the closing of receipt of tenders, and our failing or declining to enter into a contract in the form hereinafter mentioned for the amount of our tender, the said security may be forfeited in lieu of damages to which the Owner may be entitled by reason of our failure or refusal to enter into a contract.

IN SUBMITTING THIS TENDER, we recognize the right to the Owner to accept any tender at the prices submitted, or to reject all tenders.

WE SUBMIT HEREWITH a list of trades we propose to execute ourselves:

_____

_____

_____

WE SUBMIT HEREWITH a list of sub-contractors we propose to use on this contract, reserving to us, however, the right to substitute other sub-contractors for any trades in the event of any sub-contractor withdrawing their tender or becoming bankrupt after the date hereof. Any such substitution shall be subject to the approval of the Owner.

_____

_____

_____

IF WE ARE NOTIFIED OF THE ACCEPTANCE OF THIS TENDER WITHIN THE TIME ABOVE SPECIFIED, WE WILL:

a) Execute the most recent edition of the "Standard Construction Document" CCDC-4 (Unit Price Contract).

b) Furnish a Ten Percent (10%) Certified Cheque as Performance Deposit or a Fifty Percent (50%) Performance Bond and a Fifty Percent (50%) Labour and Materials Bond.

c) Commence work on the _____ day of _____, 20___ and complete the entire work included in the contract on or before the _____ day of _____, 20___ resulting in a total number of construction weeks of _____.

Yours truly,

_____ _____

Name (printed) Signature

_____ _____

Name (printed) Signature

_____

(Affix Corporate Seal)

Schedule of Unit Prices
Shepard Drive Parking Lot
Town of Stratford, PEI

Item #	Description	Section	Quantity		Unit Price	Total Price
1.	Parking Lot Construction, including but not limited to labor, excavation, re-grading existing subgrade, additional material as required to achieve design grade, proof rolling, backfilling, compaction, tree removal (as directed), landscaping, 100mm topsoil and hydroseed, 300mm sandstone, 150mm Class A, 60mm base, 40mm seal.	32 01 01 Part 1.4.1	1,880	m^2	$_____	$_____
2.	Access Road Construction, including but not limited to labor, excavation, re-grading existing subgrade, additional material as required to achieve design grade, proof rolling, backfilling, compaction, tree removal (as directed), landscaping, 100mm topsoil and hydroseed, 300mm sandstone, 150mm Class A, 60mm base, 40mm seal.	32 01 01 Part 1.4.2	200	m^2	$_____	$_____
3.	Catchbasins: Supplied and installed, c/w RAM-NEK gasket material, precast bases, floating frames and covers, excavation, backfilling, compaction, shoring and dewatering as required.	33 05 16 Part 1.3.1				
	- 750 mm dia.		2	ea	$_____	$_____
	- 1050 mm dia.		1	ea	$_____	$_____
	-Sluice Box		1	ea	$_____	$_____
4.	Storm Main: Supplied and placed including gasketted joints, excavation, backfilling, compaction, shoring, shoring and dewatering as required.	33 40 00 Part 1.4.1				
	- 300 mm dia.		60	m	$_____	$_____
	- 450 mm dia.		30	m	$_____	$_____
5.	Line Painting; Supplied and installed complete, including but not limited to all labor, equipment, materials, etc.	32 17 23 Part 1.3.1	1	L.S.	$_____	$ _____
6.	Exploratory Excavation: As indicated on design drawings.	31 23 33 Part 1.4.2	1	ea	$_____	$ _____
7.	Parking Lot Lighting: Supplied and installed including, but not limited to, luminaires, poles, concrete bases, lighting control, enclosure, etc.		2	ea	$_____	$ _____

Item #	Description	Section	Quantity		Unit Price	Total Price
8.	Electrical: Supplied and placed including, but not limited to, trenching, augering (where noted on drawings), conduit, conductor, reinstatement, etc.		80	m	$_____	$ _____
9.	Sandstone/Select Borrow (provisional).	Special Provision Note #3	50	m^3	$_____	$ _____
10.	Drainage Gravel (Provisional).	Special Provision Note #29	25	m^3	$_____	$ _____
11.	Rock Excavation (Provisional).	31 23 33 Part 1.4.3	5	m^3	$_____	$_____
12.	General Cash Allowance	01 21 13 Part 1.1.3	1	L.S.	$ 30,000.00	$ 30,000.00
					Subtotal =	$_____
					HST (15%) =	$_____
					Total Tender Amount =	$_____

Contractor _____

_____

_____

_____

Signature _____

Part 1 - General

1.1 DESCRIPTION OF WORK

.1 The project site is located on Shepard Drive in the Town of Stratford.

.2 The work involves the construction of a new parking lot which is approximately 1,880 m^2.

.3 The work also involves the construction of a new 7.5m wide access which is approximately 200 m^2.

.4 The work includes the installation of 84 m of storm main, including associated structures.

.5 The work includes the supply and installation of light standards and associated electrical work.

1.2 DOCUMENTS REQUIRED

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

.2 Contract Drawings

.3 Specifications

.4 Addenda

.5 Reviewed Shop Drawings

.6 Change Orders

.7 Other Modifications to Contract

.8 Copy of approved Work Schedule

.9 Manufacturers' Installation and Application Instructions.

.10 Copy of OH&S Regulations for P.E.I.

.11 Regulatory Approvals.

1.3 WORK SCHEDULE

.1 Prior to contract award, provide a schedule showing anticipated progress stages and final completion of work within time period required by Contract documents.

.2 Interim reviews of work progress based on work schedule will be conducted as decided by Engineer and Schedule updated by Contractor in conjunction with and to approval of Engineer.

.3 All costs incurred by the Owner as a result of delays and schedule overruns caused by the Contractor and not previously approved will be at the Contractor's expense.

1.4 MEASUREMENT AND PAYMENT

.1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.

1.5 CONTRACTOR'S USE OF SITE

.1 Do not unreasonably encumber site with materials or equipment.

.2 Move stored products or equipment which interfere with operations of Engineer or other contractors.

.3 Obtain and pay for use of additional storage or work areas needed for operations. Ensure these areas are cleaned up and left in a state equal to or better than the existing conditions, when the project is complete.

1.6 CODES AND STANDARDS

.1 Perform work in accordance with National Building Code of Canada (NBC) (latest edition) and any other code of provincial or local application provided that in any case of conflict or discrepancy, more stringent requirements shall apply.

.2 Meet or exceed requirements of specified standards, codes and referenced documents.

1.7 SETTING OUT WORK

.1 Set grades and lay out work in detail from control points and grades established by the Engineer.

.2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.3 Supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.

.4 Provide devices needed to layout and construct work.

.5 Supply stakes and other survey markers required for laying out work.

1.8 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Inform Engineer of impending installation and obtain their approval for actual location.

.3 Submit field drawings to indicate relative position of various services and equipment when required by Engineer.

1.9 EXISTING SERVICES

.1 Where work involves breaking into, or connecting to existing services, carry out work at times directed by governing authorities.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Engineer of findings.

.3 Submit schedule to and obtain approval from Engineer for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Where unknown services are encountered, immediately advise Engineer.

.5 All existing utilities damaged during construction shall be repaired by the Contractor, or the utility Owner, at the Contractor's expense, and to the satisfaction of the Engineer.

.6 Where watermain or sewermain or stormline is in close proximity to existing electric and telephone poles, these poles must be maintained while construction is proceeding. All costs associated with this work should be incorporated into Contractor's price. No extra will be allowed.

1.10 EXISTING SURFACE CONDITIONS

.1 Where construction may impact any existing surface conditions such as fencing, trees, signs, etc., the Contractor is responsible to replace and/or reinstate to the original condition as approved by the Engineer, at the Contractor's expense.

.2 All equipment shall be properly equipped to not damage asphalt or concrete surfaces during the project. Any damage to existing surfaces will be reinstated to original condition at the Contractor's expense.

.3 All asphalt/concrete surfaces which require excavation are to be sawcut prior to excavation.

1.11 INSPECTION / TAKEOVER PROCEDURES

.1 Prior to application for Certificate of Substantial Completion, carefully inspect the work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected. Notify Engineer in writing, of satisfactory completion of the work and request an inspection.

.2 During Engineer's inspection, a list of deficiencies and defects will be tabulated. Correct same at the Contractor's expense.

.3 Upon final inspection and testing, if any part of any component of the project does not meet project specifications, then the following shall occur:

(a) The Contractor shall immediately remove all components that do not meet project specifications and replace them with materials that do meet project specifications at no additional cost to the Owner; or,

(b) The Contractor shall make arrangements with the Owner so as to satisfy the Owner that no short- or long-term negative consequences will occur as a result of the components not meeting specifications. If the Contractor cannot satisfy the Owner of these requirements, then all components that do not meet project specifications shall be removed and replaced by the Contractor at no additional costs to the Owner.

(c) All costs associated with non-compliance with specifications, including testing materials, labour, and engineering will be the Contractor's responsibility.

.4 When the Engineer has deemed the deficiencies and defects have been corrected and it appears requirements of contract have been performed, make application for Certificate of Substantial Completion.

1.12 CLEANING

.1 General:

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti pollution laws.
- .2 Store volatile wastes in covered metal containers and remove from premises daily.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

.2 Materials:

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

.3 Cleaning during Construction:

- .1 On a daily basis maintain premises free from debris and waste material.
- .2 Maintain project site and public properties free from accumulations of waste materials and rubbish.
- .3 Provide on site containers for collection of waste materials and rubbish.
- .4 Remove waste materials and rubbish from site.

.4 Final Cleaning:

- .1 Leave site in clean and neat condition removing all rubbish, excess materials and any items used on site, but designated to remain in the work.

1.13 MATERIALS

.1 All materials to be incorporated into the work will be new and shall comply with the required acceptable materials list unless stated otherwise or agreed to by the Engineer.

1.14 CHANGE ORDERS

.1 No extra will be allowed to proceed without the execution of a Change Order signed by the Owner or the Owner's Representative and the Contractor, specifying the work to be conducted and a fixed cost for said work.

1.15 SITE MAINTENANCE AND CLEAN-UP

.1 The Contractor is advised that extra care must be taken during construction, at the end of every day worked and over weekend or shut-down periods, to maintain dust control and site clean-up. Bidders are advised that the minimum daily clean-up requirements will be that all areas affected will be wet down and hand swept or equivalent method as approved by the Engineer.

.2 As each area is 100% completed, with all mains, services, topsoiling and sodding in place, a complete high-pressure water washing of all affected areas will be required at the Contractor's expense.

.3 These clean-up items will be strictly enforced. No effort or costs will be incurred by the Owner.

1.16 LIMITATION OF OPERATION

.1 Except for such work as may be required to maintain the travelled roadway in a safe and satisfactory condition for traffic and as noted in .2 below, the Contractor shall not carry out operations under the contract between a ½ hour before sunset and a ½ hour after sunrise, or from 7:00 am to 7:00 pm on any working day, or at any time on Saturday, Sunday, Thanksgiving Day or statutory holidays and in accordance with the Town of Stratford Noise & Nuisance By-law. The most stringent will apply. This includes the start-up and moving of equipment on the site as well as at the marshaling yard.

.2 The Engineer may require the Contractor to work on Saturdays, Sundays or statutory holidays to assure the safety of the travelling public. In addition, the Engineer may require the Contractor to work on Saturdays in order to complete the work.

.3 The Engineer may in writing require the Contractor to cease or limit operations under the Contract, or any working day or days, if the operations are of such nature, or if the work is so located, or if the traffic is of such volume that the Engineer deems it necessary or expedient to do so.

1.17 ASSISTANCE TO THE CONSULTANT AND CONSULTANT'S REPRESENTATIVE

.1 During the performance of the work, provide necessary labour and tools to assist the Engineer and the Engineer's Representative in measuring, checking, testing and examining the Contractor's work. The cost of all such being deemed to be incidental to the performance of the contract.

1.18 INSURANCE

.1 The Contractor must furnish the following insurance policies to the satisfaction of the Town of Stratford prior to commencement of any work.

.2 The Contractor shall, without limiting its obligations or liabilities herein and at its own expense, provide and maintain the following insurances in forms and amounts acceptable to the Owner.

.1 Comprehensive General Liability in an amount not less than $5,000,000. inclusive per occurrence against bodily injury, death and property damage, with a property damage deductible not exceeding two thousand five hundred dollars ($2,500.00). The Town of Stratford, WSP Canada Inc. and the Government of P.E.I. are to be added as an insured under this policy. Such insurance shall include, but not be limited to the following:

.1 Products and Completed Operations Liability;
.2 Blanket Written Contractual Liability;
.3 Contingent Employer's Liability;
.4 Personal Injury Liability;
.5 Non-owned Automobile Liability;
.6 Sudden and Accidental Pollution Liability;
.7 Fire Fighting Expense Liability.

.2 Automobile Liability on all vehicles owned, leased, operated, or licensed in the name of the Contractor in an amount not less than $2,000,000.00.

.3 All the foregoing insurance shall be primary and not require the sharing of any loss by any insurer of the Town of Stratford, WSP Canada Inc., and/or the Government of P.E.I. and preclude subrogation by the insurer against the aforementioned parties.

.4 Proof of Insurance; certified copies of the required insurance, as mentioned, must be presented to the Town of Stratford at the time of signing of the contract and shall be subject to the Town of Stratford's approval for adequacy of protection. Approval by the Town of Stratford of any policy filed by the Contractor shall in no way relieve the Contractor of its obligations to provide the insurance referred to in the contract, nor shall it imply that the policies are in accord with the terms of this agreement.

.1 All required insurance shall be endorsed to provide the Town of Stratford 60 days advance written notice of cancellation or material change.

.2 All insurances shall be in effect until issuance of the "Certificate of Final Acceptance" and for the duration of the Warranty Period

.3 The Contractor hereby waives all rights of recourse against the Town of Stratford, WSP Canada Inc., and the Government of P.E.I. with regard to damage to the Contractor's property.

.4 The Contractor shall require and ensure that each subcontractor maintain liability insurances comparable to that required above.

.5 Claims made to policies must have a 3-year extended reporting option on their policy.

.6 The Contractor agrees to indemnify and save harmless the Owner and the Owner's Representative from any and all costs, charges or expenses howsoever arising out of any breaches in the insurance coverages or part thereof.

.5 Property damage deductible shall be two thousand five hundred dollars ($2,500.00) per occurrence.

Part 2 - Products

2.1 NOT USED

.1 Not Used.

Part 3 - Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 – General

1.1 CASH ALLOWANCE

.1 The cash allowance shall be utilized for unforeseen items that may arise during construction, or other items that the Owner may require included in the work.

.2 The cash allowance shall not be used for items for which an established unit rate has been given during tendering.

.3 An amount of thirty thousand dollars ($30,000) shall be allocated to this item and has been shown as a separate item within the schedule of unit prices.

1.2 UNUSED ALLOWANCE

.1 Any portion of the allowance amount remaining upon completion of the contract shall be credited to the Owner.

Part 2 – Products

2.1 NOT USED

.1 Not Used.

Part 3 – Execution

3.1 GENERAL

.1 The Contractor shall be allowed a ten percent (10%) mark-up for overhead and profit above actual costs for work done by the Contractor's own forces.

.2 For work performed by primary sub-contractor, the General Contractor shall be allowed five percent (5%) mark-up for overhead and profit above approved sub-contractors invoices.

.3 The primary sub-contractor shall be allowed ten percent (10%) mark-up for overhead and profit above actual costs for work done by the primary sub-contractor's own forces.

.4 For work performed by the primary sub-contractor's sub-contractors, the primary sub-contractor will be allowed five percent (5%) mark-up for each subsequent sub-contractor working under the sub-contractor's control.

.5 The maximum total mark-up for any Change Order or Change Directive shall be thirty percent (30%).

.6 No mark-up will be allowed for the cost of construction equipment when such costs are based on rates which already include contractor's overhead and profit.

.7 No amount of the cash allowance is to be released unless accomplished by a detailed Change Order signed by the Engineer and/or the Owner.

.8 Note that the above does not preclude the option of the Contractor Administrator and Contractor negotiating a lump sum item of unit price payment for change in the Work, Extra Work and Additional Work.

END OF SECTION

Part 1 - General

1.1 CONSTRUCTION SAFETY MEASURES

.1 Observe and enforce construction safety measures as required by the National Building Code (latest edition) Part 8, the laws of the Province of Prince Edward, the laws of the Dominion of Canada, Prince Edward Island Worker's Compensation Board and all Municipal By laws, Policies and Authorities.

1.2 SAFETY REQUIREMENTS

.1 Construction Safety Measures:

.1 The work performed by any Contractor or subcontractor must comply with the Occupational Health and Safety Act and its Regulations. This Act and the Regulations are available from:

Island Information Service
P.O. Box 2000
Charlottetown, P.E.I.
C1A 7N8
Telephone: 368 4000

.2 The Contractor will be required to provide proof that their company complies with all provisions of the PEI Occupational Health and Safety Act, as well as the PEI Workers Compensation Act and Regulations.

.3 During the process of the quoted work, companies will be required, at the request of the Owner, to provide written verification that their work is in compliance.

.4 Contractor must have personnel trained and certified for work in confined spaces.

.5 The Owner or the Owner's Representative reserves the right to order changes in construction methods or stoppages of work if work does not comply with the Act. Any cost due to these changes or stoppages shall be the responsibility of the Contractor.

.6 The Contractor agrees to indemnify and save harmless the Owner and the Owner's representative from any and all costs, charges or expenses howsoever arising out of any breaches in the Occupational Health and Safety Act and its Regulations.

.2 All Contractors must have an identified Safety Representative for the project. This safety representative will be the person to which WSP and/or the Town of Stratford will give notice of any perceived safety issues and if the issue(s) is not rectified in a timely fashion, then the Provincial Occupational Health and Safety will be notified.

.3 WSP and the Town of Stratford are not acting as the Contractor’s Safety Representative, and do not accept responsibility of any safety issues that go unnoticed or unreported by WSP and/or the Town of Stratford. The responsibility still remains with the Contractor and it is the Contractor’s responsibility to have knowledge of the safe working practices required by OH&S and their company safety policy where one exists.

Part 2 - Products

2.1 NOT USED

.1 Not Used.

Part 3 - Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 - General

1.1 GENERAL

.1 The Contractor shall comply with the Environmental Protection Act and its Regulations. Not so as to limit the generality of the foregoing, the contractor agrees as follows:

1.2 FIRES

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

1.3 DISPOSAL OF WASTES

.1 Dispose of rubbish and waste materials at authorized site in accordance with local solid waste requirements.

.2 Remove and dispose containers and waste fluids associated with vehicle maintenance in waste disposal site approved by Engineer outside site boundaries.

.3 Disposal of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers is prohibited. Dispose of all waste materials at waste disposal site approved by Engineer outside boundary. Littering is prohibited.

.4 Do not bury rubbish and waste material on site.

1.4 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing silt in suspension into waterways, or drainage systems.

.3 Dispose of water containing silt in suspension in accordance with local authority requirements. Water from work areas must be pumped a minimum of 50 m from the waterways into sediment traps or into tank trucks.

.4 Construct temporary silt fences with sufficient surface areas as directed by Engineer, prior to commencing excavation of any nature, near waterways.

1.5 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract or as directed by the engineer on site.

.2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control as required.

1.6 EROSION CONTROLS

.1 Contractor is required to install, inspect and maintain in proper working order temporary erosion, siltation and pollution control features as directed and approved by Engineer. These devices are to be removed in the proper manner.

.2 Cuts and fills carried out by Contractor adjacent to waterways are to be properly stabilized using handseeding, hydroseeding, sodding or other approved methods to

prevent entry of silt into waterway. Short-term erosion control devices approved by Engineer must be utilized in interim until long-term stabilization is established.

.3 To minimize runoff, work on slopes adjacent to water bodies will be curtailed during periods of heavy rainfall, as directed by the Engineer.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 VEHICULAR MOVEMENTS

.1 Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas, and future right-of-ways).

1.8 DISPOSAL OF WASTES

.1 Dispose of all waste materials (including hazardous materials), containers and waste fluids associated with vehicle maintenance off site to the Engineers approval.

.2 All garbage must be stored and handled in conformance with local authority requirements. Maintain site in a tidy condition, free from accumulation of waste products, debris and litter.

.3 Should unsuitable excavated material be suspected of being contaminated this material must be tested by a materials testing firm and if confirmed, disposed of properly in accordance with local authorities having jurisdiction.

1.9 STORAGE AND HANDLING OF FUELS AND DANGEROUS CHEMICALS

.1 Fuel storage facilities will not be permitted on site.

.2 Exercise care in handling of fuels or dangerous materials to minimize potential for spills. Report immediately any spills to Engineer. Contractor is responsible for clean-up, repair or rehabilitation resulting from spills to satisfaction of Engineer.

.3 Equipment use will be restricted to the existing travelling right-of-way or contract limits. Use in other areas to be approved by the Engineer.

1.10 RELICS AND ANTIQUITIES

.1 Give immediate notice to Engineer if evidence of historical or archaeological finds are encountered during construction and await written instructions from Engineer before proceeding with the work.

.2 Relics, antiquities and items of historical interest found on site shall remain the property of the Province of Prince Edward Island.

1.11 SANITARY FACILITIES

.1 Temporary sanitary facilities will be required and permitted in designated areas only.

.2 Hours for servicing or cleaning of temporary sanitary facilities will be restricted, and timing for such activities must be approved by the Engineer.

1.12 INDEMNITY

.1 The contractor agrees to indemnify and save harmless the Owner and the Owner's representative from any and all costs, charges or expenses, however so arising out of any breaches of the Environmental Protection Act and its Regulations.

1.13 POLLUTION CONTROL

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

1.14 PROTECTION OF EXPOSED AREAS

.1 The Contractor must protect all exposed areas within the project limits as follows:

.1 Supply and place Geotextile Silt Fence around entire perimeter or as shown on drawings.

1.15 ON-SITE STABILIZATION

.1 At the end of each working day, stabilize exposed areas as required.

1.16 MEASUREMENT AND PAYMENT

.1 Items under Section 01 35 43 will not to be paid for separately but shall be considered incidental to the work required for the project.

Part 2 - Products

2.1 NOT USED

.1 Not Used.

Part 3 - Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 – General

1.1 RELATED WORK

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

1.2 SCOPE OF WORK

.1 This section specifies requirements for providing materials testing and report presentation by an accredited Materials Testing Firm for the entire project work as specified herein.

.2 For the purpose of this contract, the Contractor is responsible for materials testing.

1.3 MEASUREMENT AND PAYMENT

.1 Materials testing shall not be paid for separately. All costs to be included into unit price pay items.

Part 2 – Products

2.1 MATERIALS TESTING REQUIREMENTS

.1 Sandstone (Premium Borrow & Select Borrow)

.1 Test requirements are as follows:

Test	Procedure	Frequency
Determination of % passing 75µm Sieve	ASTM C-117	One per material type as delivered to the job
Standard Proctor Density	ASTM D-698	Same as above.
Optimum Moisture	ASTM D-698	Same as above.
Field Density Determination	ASTM D-2922	One per 50 m/lift (minimum of 4 per contract)
Thickness Determination		Same as above.

.2 A Compaction Control Report for Sandstone (Premium Borrow & Select Borrow) showing, as a minimum, the following:

.1 Date tested

.2 Test location (chainage and offset)

.3 Material thickness

.4 Field moisture

.5 Optimum moisture

.6 % compaction

All Sandstone (Premium Borrow& Select Borrow) shall be compacted to 100% Standard Proctor Density.

.2 Gravel:

.1 Provide placement control which includes the following:

Test	**Procedure**	**Frequency**
Washed Sieve Analysis	ASTM C-136 & C-117	Three per material type as delivered to the job
Standard Proctor Density	AASHTO T-99 & T-224	Same as above.
Optimum Moisture	AASHTO T-99 & T-224	Same as above.
Field Density Determination	ASTM D-2922	One per 50 m/lift (minimum of 4 per contract)
Thickness Determination		Same as above.
Los Angeles Abrasion	ASTM C-131	One per pit source

.2 A Compaction Control Report for gravel showing, as a minimum, the following:

.1 Date tested

.2 Test location (chainage and offset)

.3 Material thickness

.4 Field moisture

.5 Optimum moisture

.6 % compaction

All gravel shall be compacted to 100% Standard Proctor Density.

.3 Hot Mix Asphaltic Concrete:

.1 The Contractor shall provide production and placement control which includes, but is not limited to, the following tests:

Test	**Procedure**	**Frequency**
Bulk Density	ASTM D2726*	At a frequency of one per 250 tonnes of each mix type (with a minimum of 2 per contract per mix type)
Marshall Stability	ASTM D-1559	Same as above.
Marshall Flow	ASTM D-1559	Same as above.
Maximum Theoretical Specific Gravity	ASTM D-2041	Same as above.
Air Voids	MARSHALL	Same as above.
Voids in Mineral Aggregate	MARSHALL	Same as above.

Test	**Procedure**	**Frequency**
Voids Filled with Asphalt	MARSHALL	Same as above.
% Asphalt Metered		Same as above.
% Asphalt Extracted	ASTM D-4125 or ASTM D-2172	Same as above.
Extracted Gradation (Washed)	ASTM C-136 & C-117	Same as above.
Combined Aggregate Specific Gravity	MARSHALL	Same as above.

***** *For specimens that contain moisture*

.2 The Contractor's documentation of production control shall include, as a minimum, the following:

- .1 Contractor (paving)
- .2 Contract
- .3 Date
- .4 Mix type
- .5 Job mix formula percentages
- .6 Sample times
- .7 Sample temperatures
- .8 Sample compaction temperatures

.3 The Contractor's documentation of placement control shall include, as a minimum, the following:

- .1 Mix temperature (minimum of two)
- .2 Mix thickness

.4 A Compaction Control Report showing, as a minimum, the following:

- .1 Date cored
- .2 Core location (station & offset)
- .3 Lift
- .4 Bulk Relative Density
- .5 Maximum Theoretical Relative Density
- .6 % Compaction
- .7 Lot Average % Compaction (based on a mean maximum theoretical relative density)
- .8 Core thickness
- .9 Average thickness
- .10 Specified thickness

.11 T-test

.4 Concrete Curb and Gutter/Sidewalk:

.1 The Contractor shall provide placement control which includes:

Test	**Procedure**	**Frequency**
Air Content	CSA A23.1 & CSA A23.2	CSA A23.1
Slump	CSA A23.1 & CSA A23.2	CSA A23.1
Compressive Strength	CSA A23.1 & CSA A23.2	CSA A23.1
Thickness Determination	measure before pour	each pour

.2 Control Report for concrete showing, as a minimum, the following:

.1 Date tested
.2 Test location (chainage)
.3 Material thickness
.4 % air content
.5 Slump
.6 Compressive strength

.5 Trench Compaction:

.1 The Contractor shall provide placement control which includes:

Test	**Procedure**	**Frequency**
Standard Proctor Density	ASTM D-698	One per material type
Optimum Moisture	ASTM D-698	Same as above.
Field Density Determination	ASTM D-2922	One per line (*) / lift (minimum of 4 per contract)

** line definition is all pipe between two catchbasins and/or manholes.*

.2 A Compaction Control Report for Native Backfill showing, as a minimum, the following:

.1 Date tested
.2 Test location (chainage)
.3 Field moisture
.4 Optimum moisture
.5 % compaction

Compaction for all locations shall be 100% Standard Proctor Density.

.6 Bedding Sand (Where Required):

.1 Test requirements are as follows:

.1 Sieve analysis prior to delivery to site.
.2 Sieve analysis during the work to ensure requirements of section 402 of Department of Transportation and Infrastructure, “General Provisions and Contract Specifications for Highway Construction.”

.3 There shall be a maximum of 35% difference between the percents passing consecutive sieves.

Part 3 – Execution

3.1 SUBMISSION OF TEST RESULTS

.1 All test results and compaction results shall be grouped by item and 3 copies forwarded to the Engineer within 48 hours of completion of the item.

.2 The Contractor shall also submit upon project completion a bound report outlining all test results. Three copies of the final report shall be required.

.3 The final report as prepared by a recognized Materials Testing Firm shall include an executive summary stating that all materials as tested and used on the project meet project specifications.

.4 If all materials as tested do not meet project specifications, then the following shall occur:

.1 The Contractor shall immediately remove all materials that do not meet project specifications and replace them with materials that do meet project specifications at no additional costs to the Owner.

or

.2 The Contractor shall make arrangements with the Owner so as to satisfy the Owner that no short- or long-term negative consequences will occur as a result of the materials not meeting specifications. If the Contractor cannot satisfy the Owner of these requirements, then all materials that do not meet project specifications shall be removed and replaced by the Contractor at no additional costs to the Owner.

.3 All costs associated with non-compliance with specifications, including testing materials, labour and engineering, will be the Contractor’s responsibility.

END OF SECTION

Part 1 - General

1.1 DESCRIPTION

.1 This Section specifies requirements for submission of layout of all facets of the project and the preparation and submission of Record Drawings.

.2 It is the intent of this section that a Prince Edward Island Land Surveyor be commissioned to provide coordinates for all above ground utilities and the appurtenances for the purposes of Record Drawings and also confirm any necessary inverts supplied by the Contractor's record drawings. The Contractor will be responsible for all remaining requirements of this section.

1.2 MEASUREMENT AND PAYMENT

.1 There will be no measurement for payment under this section. Project Layout / Record Drawings will be considered incidental to the project.

Part 2 - Products

2.1 NOT USED

.1 Not Used.

Part 3 - Execution

3.1 PROJECT LAYOUT

.1 Initial Layout:

.1 A Prince Edward Island Land Surveyor shall provide initial control points for use by the Contractor's survey crew. All remaining layout shall be the responsibility of the Contractor's survey crew, unless noted otherwise.

.2 Construction Layout:

.1 The Contractor's survey crew shall be permitted to provide layout for normal daily construction activities. Where deemed necessary by the Contractor and/or the Engineer, the services of a Prince Edward Island Land Surveyor shall be utilized for the installation of control points.

.2 A Prince Edward Island Land Surveyor shall provide the following additional services:

.1 Locate property rights of way where water and sewer services are to be located.

.2 Locate and layout all service easements as identified in plans and specifications.

3.2 CONTROL AND CERTIFICATION

.1 The Engineer shall provide the Contractor with three (3) sets of full-size contract drawings for Record Drawings purposes.

.2 Maintain Project Record Drawings and record accurately deviations from contract drawings caused by site conditions or changes ordered by the Engineer. Submit typed report outlining all deviations to the Engineer.

.3 Mark changes in red on one set of contract drawings.

.4 The Contractor shall record the following items:

.1 Water, Sewer and Storm Drainage System

.1 Depths of various elements of works in relation to geodetic elevation.

.2 Horizontal and vertical location of all above ground and underground utilities and appurtenances referenced to permanent surface features to the satisfaction of the Engineer.

.3 Field changes of dimensions.

.4 Bends, grade changes, and other significant deviations which are concealed in construction and cannot be identified by visual inspection following construction.

.5 Manholes, catch basins, invert elevations, elevation and locations of water, sewer and storm drainage system. and locations of water and sewer services.

.6 Determined invert elevation of all sewer services at R.O.W. limits.

.5 At completion of project and prior to final inspection, neatly transfer records to two sets of contract drawings using fine red marker. Neatly print lettering and number in size to match original. Lines may be drawn free hand but shall be neat and accurate. Add at each Drawing Title Block Note: "AS RECORDED".

.6 The Prince Edward Island Land Surveyor will be required to provide coordinates for all above ground utilities and appurtenances and also confirm all inverts and elevations shown on Contractor’s record drawings.

.7 Submit one set of Red Line Mark-ups to the Engineer and submit the second set to the contractor's Prince Edward Island Land Surveyor.

3.3 RECORD DRAWINGS

.1 Data Collection:

.1 The Contractor shall compile the following information and prepare a full set of record drawings.

.1 One digital copy of all design drawings from the Engineer in Civil 3D drawing files or in DXF files.

.2 One set of Red Line Mark-ups as prepared by the Contractor.

.3 Field measurements for all additional data required to prepare a complete set of "Record Drawings.”

.2 Submission Requirements:

.1 "Record Drawing" plans shall be submitted to the Engineer by the Contractor in the digital and hard copy format with "RECORD DRAWINGS" clearly printed on such plans.

.1 Two complete sets of preliminary "Record Drawings", hard copy format must be submitted to the Engineer for initial review. Resubmit final "Record Drawings" with any deletions or additions required by the Engineer's initial review.

.2 Final "Record Drawings" submission shall consist of the following:

.1 Two copies on USB stick in Civil 3D format (latest version).

.2 Three hard copies on paper.

.2 Record Drawings shall include the following as applicable:

.1 Existing Conditions

.1 If existing conditions data is included, provide all information included on design drawings, along with any changes to existing conditions as required.

.2 Storm Drainage System

.1 If storm drainage systems are included, provide all information included on design drawings along with any items that vary from design drawings. Typical items include catch basins, pipes, culverts, profiles, alignment, etc.

.3 Sewer Portion

.1 If a sewer system is included, provide all information included on design drawings along with any items that vary from design drawings. Typical items include manholes, pipes, profiles, alignment, etc.

.4 Water Portion

.1 If a water system is included, provide all information included on design drawings along with any items that vary from design drawings. Typical items include all services, valves, bends, hydrants and main lines.

.5 Details

.1 If details data is included, provide all information included on design drawings along with any items that vary from design drawings.

.6 Structures

.1 If a building and/or structure is included, provide all information included on design drawings along with any items that vary from design drawings, including electrical and mechanical items.

.3 All data shall be superimposed onto original design plans as follows:

.1 Place location of all items previously described in plan form.

.2 Provide "tie ins" for all water and sewer services to the nearest permanent on-site structure. Two individual measurements are required for each service.

.3 Provide co-ordinates for all above ground utilities and appurtenances.

.4 Revise profiles as required if changes to original design plans occurred.

.5 Remove all design notes from original design plans.

.6 Clearly stamp "RECORD DRAWINGS" on each drawing along with date, contractor's name, surveyor's name (where necessary).

.7 All drawings shall be signed by the Contractor and the Prince Edward Island Land Surveyor (where necessary).

Note: It is the intention of this section that all drawings issued for tender are to be modified as required and returned as “Record Drawings” drawings including cover sheets and details.

3.4 SAMPLE

.1 A sample drawing showing a typical Record Drawings will be provided to the successful tenderer. The sample drawing quality is to be considered as a minimum requirement for Record Drawing submission from the Contractor.

END OF SECTION

Part 1 – General

1.1 GENERAL

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

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)

.1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.2 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop drawings:

.1 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.

.2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

.3 Certificates:

.1 Provide CSA certified equipment and material.

.2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities 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.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data 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 principal 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.

1.5 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 Store and protect all equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.6 ELECTRICAL WORK INCLUDED

.1 The specification complements the drawings in describing the supply and installation of a complete electrical system. This system shall include but not necessarily be limited to the following:

.1 Trenching and backfilling

.2 Supply and installation of exterior lighting and conduits.

.3 Supply and installation of conductor.

.4 Supply and installation of recessed distribution unit

1.7 CONTRACT DRAWINGS

.1 The specification together with the drawings are intended to provide a description of a complete electrical system and therefore there shall be no omission of the items necessary or required to make a finished, workmanlike, first-class installation, even though each

and every item of labour and material may not be mentioned in the specification or shown on the drawings.

.2 Items indicated on floor plans and not on riser diagrams, or vice versa, shall be considered fully covered by both.

.3 Runs of conduit and device locations indicated on the drawings are diagrammatic and exact locations must be determined by this contract as the work proceeds, with due regard to the structure and the work of other trades. This contract shall make any changes dictated by structural requirements, or conflicts with other trades, without charge.

.4 Dimensions shall not be scaled from the electrical drawings but shall be obtained from the civil, architectural and/or structural drawings. Any discrepancy between the drawings and building or site shall be questioned before proceeding with the installation.

1.8 CODES AND STANDARDS

.1 As a minimum standard perform all work in accordance with the requirements of the Provincial Department of Labour, Canadian Electrical Code C22.1-2021 Part 1 and National Building Code 2020 Edition. These standards together with all local or municipal rules, regulations, and ordinances shall be considered as the latest approved editions at the time of tender closing. In no instance, shall the standard established in these contract documents, be reduced by any codes.

.2 Do underground systems in accordance with CAN/CSA C22.3.

.3 Abbreviations for electrical terms: to CSA Z85-1983.

.4 Comply with CSA Certification Standards and Electrical Bulletins in force at the time of tender submission.

1.9 INSPECTIONS, PERMITS AND FEES

.1 Obtain all inspections and permits required by all laws, ordinances, rules and regulations by the public authority having jurisdiction at the site for work of this Contract and obtain certificates of such inspections and submit same and pay all charges in connection therewith. An inspection by owner shall be obtained before final payment for work shall be considered due.

1.10 CO-ORDINATION

.1 Co-ordinate work with work of other divisions to avoid conflict.

.2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.

.3 Locate all existing underground services and make all parties aware of their existence and location.

.4 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division.

1.11 CUTTING AND PATCHING

.1 Inform all other divisions on time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1.

1.12 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark all live parts “LIVE 120 VOLTS”, or with appropriate voltage in English.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

1.13 RECORD DRAWINGS

.1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Have the white prints available for inspection at the site at all times and present for scrutiny at each job meeting.

.2 Show on the record drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run-in relation to the structure and building.

.3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.

.4 Submit record drawings within 30 days prior to start of commissioning.

1.14 INSPECTION OF WORK

.1 The Contractor shall be responsible for the execution of his work in conformity with the construction documents and with the requirements of the inspection authority.

1.15 SCHEDULING OF WORK

.1 Work shall be scheduled in phases as per other divisions of the specifications, where applicable.

.2 Become familiar with the phasing requirements for the work and comply with these conditions.

.3 No additional monies will be paid for Contractor’s requirement to comply with work phasing conditions.

1.16 FIRE STOPPING AND SMOKE SEALS

.1 All fire stopping and smoke seals required to properly accommodate the work of this Division shall be the financial responsibility of Division 26, and carried out by trades to the applicable ULC approved system of one of the approved Manufacturers provided in this document. Trades personnel must be trained by the manufacturer and provide documentation stating same.

.2 Where materials pass through fire rated walls, floors and partitions, an ULC approved fire stopping and smoke seal system shall be used to maintain or exceed the fire separations rating.

.3 Provide ULC drawings for each site-specific penetration.

.4 Work must be performed by a company with experience in the application of fire stopping and smoke seals to ULC requirements.

.5 Acceptable Manufacturers: Hilti, Tremco, 3M

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. 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.

2.2 MATERIALS AND EQUIPMENT

.1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division.

.2 Factory assemble control panels and component assemblies.

2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

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

.2 Control wiring and conduit: in accordance with Section 26 05 21 except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings.

2.4 WARNING SIGNS

.1 As specified and to meet requirements of Departmental Representative.

.2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

2.5 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

2.6 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black on white face, black white core, mechanically attached with self-tapping screws.

.2 Sizes 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:

.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Allow for average of twenty-five (25) letters per nameplate and label.

.4 Identification to be English (and French where applicable).

.5 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.

.6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.7 Terminal cabinets and pull boxes: indicate system name and voltage.

.8 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. _____ " as directed by Departmental Representative.

.9 Install directories on the back of each door of panel boards, neatly arranged and mounted in frame under transparent cover. Directories shall be typed and shall show system voltage, which outlets are on each circuit and any special information, such as sizes of fuses, etc., necessary for the proper operation and maintenance of the system.

2.7 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1-15, Canadian Electrical Code.

.4 Use colour coded wires in communication cables, matched throughout system.

2.8 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	Match existing scheme on site	
up to 600 V		
Telephone		
Other Comm Systems		
Fire Alarm		
Other Security Systems		

2.9 FINISHES

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

.1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.

.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

2.10 GROUNDING

.1 All equipment and exposed non-current carrying metal, conduits and parts shall be permanently and effectively grounded to meet minimum requirements of the C.E.C. Section 10, and as indicated on the drawings and further specified. Standards set either by drawings or specifications which are above those covered by C.E.C. Section 10, shall not be reduced under any circumstances.

Part 3 – Execution

3.1 EXAMINATION

.1 Verify that conditions are acceptable for installation of all equipment in accordance with manufacturer's written instructions.

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. Sleeves through concrete: schedule 40 steel pipe, 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 to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.5 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors.

.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.6 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Local switches: 1400 mm.

.2 Wall receptacles:

.1 General: 300 mm.

.2 Above top of continuous baseboard heater: 200 mm.

.3 Above top of counters or counter splash backs: 175 mm.

.3 Panelboards: as required by Code or as indicated.

.4 Telephone and interphone outlets: 300 mm.

.5 Wall mounted telephone and interphone outlets: 1500 mm.

.6 Fire alarm stations: 1500 mm.

.7 Fire alarm bells or horns: 2100 mm.

3.7 COORDINATION OF PROTECTIVE DEVICES

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

3.8 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.

.3 Perform tests in Accordance with this section as noted.

.4 Load Balance:

.1 Measure phase current to panelboard with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards and dry-core transformers, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.5 Conduct and pay for following tests:

.1 Power generation and 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 Insulation resistance testing:

.1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing and record value.

.6 Furnish manufacturer’s certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer’s instructions.

.7 Carry out tests in presence of Departmental Representative.

.8 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

.9 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.10 Submit test results for Departmental Representative’s review and include in Commissioning Manuals.

3.9 CARE, OPERATION AND SYSTEM START-UP

.1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

.2 Operating instructions to include following:

- .1 Wiring diagrams, control diagrams, and control sequence for each principal 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 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

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

3.10 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.4 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

.5 On completion of work, remove debris resulting from work of this Division and leave the site neat and tidy. Equipment shall be checked for proper fitting and alignment, adjusted, cleaned, repainted where necessary, and left in first class condition.

.6 This section shall be responsible for the removal of spatters, droppings, soil, labels, and debris from finished surfaces and from surfaces to receive finishes, before the set up. Work and adjacent finished work shall be left in new condition.

.7 Only cleaning materials which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material shall be used.

.8 Immediately before and during finishing work shall be made "broom clean". Interior areas shall be "vacuum cleaned" immediately before finish painting commences.

.9 Material removal shall be as often as required to avoid accumulation in order to ensure site is maintained clean.

.10 Volatile fluid wastes cannot be disposed of in storm or sanitary sewers or in open drain courses.

.11 Lowering of materials shall be controlled and shall not be dropped or thrown from stories above grade.

3.11 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with local requirements.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

END OF SECTION

Part 1 - General

1.1 PRODUCT DATA

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

.1 CSA C22.2 No .0.3-09(R2014), Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131-14, Type TECK 90 Cable.

1.3 PRODUCT DATA

.1 Provide product data in accordance with Section 01 33 00.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse and return of pallets, crates, paddling and packaging materials in accordance with Section 01 74 20.

Part 2 - Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 or 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE or RWU90 XLPE, Non-Jacketed.

2.2 TECK 90 CABLE

.1 Cable: to CAN/CSA-C22.2 No. 131 and Section 26 05 00.

.2 Conductors:

- .1 Grounding conductor: copper.
- .2 Circuit conductors: copper, size as indicated.

.3 Insulation:

- .1 Chemically cross-linked thermosetting polyethylene rated type RW90, 600 or 1000 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: flat interlocking aluminum.

.6 Overall covering: thermoplastic material.

.7 To CSA C22.2 No. 0.3 Vertical Tray Fire Test.

.8 Fastenings:

- .1 'P' clamps on 'U' channels.
- .2 Channel type supports for two or more cables at 900 mm centers.
- .3 Threaded rods: 6 mm dia. to support suspended channels.

.9 Connectors:

- .1 Watertight approved for TECK cable.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Type: ACWU90 flame retardant jacket over thermoplastic armour and meeting requirements of vertical tray fire test of CSA C22.2 0.3 with maximum flame travel of 1.2 m.

.5 Connectors: anti short connectors.

2.4 CONTROL CABLES

.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated:

- .1 Insulation: thermoplastic.
- .2 Sheath: thermoplastic jacket.

.2 Type: low energy 300 V control cable: stranded annealed copper conductors sized as indicated LVT: 2 soft annealed copper conductors, sized as indicated:

- .1 Insulation: TWH.
- .2 Shielding: tape coated with paramagnetic material wire over each conductor.
- .3 Overall covering: polyethylene jackets.

.3 Type: 600 V stranded annealed copper conductors, sizes as indicated:

- .1 Insulation: RW90 (x-link).
- .2 Shielding: non-magnetic tape over each conductor.
- .3 Overall covering: thermosetting jackets

Part 3 - Execution

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform tests using method appropriate to site conditions and to approval of Consultant 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 33 71 73.02.

.2 Lay cable in cable trays in accordance with Section 26 05 36.

.3 Terminate cables in accordance with Section 26 05 20.

.4 Cable Colour Coding: to Section 26 05 00.

.5 Conductor length for parallel feeders to be identical.

.6 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.7 Wiring in plenums: Wire shall be installed in conduit drops to fixtures shall be AC90, maximum length 3 metres. Wiring AC90 shall not be used to loop feed from fixture to fixture.

.8 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.

.9 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.10 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.

.2 In underground ducts in accordance with Section 33.

3.4 INSTALLATION OF TECK 90 CABLE (0-1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable exposed, securely supported by straps.

3.5 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on channels.

.2 Install AC90 armoured cable from junction boxes located in main EMT runs in all accessible T-Bar ceilings, mechanical and electrical rooms with no ceilings to lights. Maximum length 3.0 meters.

3.6 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit and cable troughs.

.2 Ground control cable shield.

END OF SECTION

Part 1 - General

1.1 RELATED SECTIONS

.1 Section 26 05 01 - Common Work Results - Electrical.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837-1989(R1996), Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International).

Part 2 - Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required.

.2 Grounding conductors: bare stranded copper, tinned, soft annealed, size as indicated.

.3 Insulated grounding conductors: green, type RW90.

.4 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Bonding jumpers, straps.

.5 Pressure wire connectors.

Part 3 - Execution

3.1 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 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Soldered joints not permitted.

.6 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.7 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.8 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.

3.2 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral of secondary 120/208 V system.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to, the following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators and distribution panels.

3.4 FIELD QUALITY CONTROL

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

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 - General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CSA C22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.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 33 00.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal.

.2 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

Part 2 - Products

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 flat covers.

.4 Cast junction and pull boxes in basements and attics.

.5 Exterior pull box

.1 Round Assembly, HDPE Box, Polymer Concrete Cover, Hex Bolt

.2 Standard of Acceptance Pencell; PR121224,

2.2 CABINETS

.1 Construction: welded sheet steel hinged door, latch and catch.

.2 Type E Empty: flush overlapping sides mounting as indicated.

.3 Type T Terminal: flush overlapping sides mounting as indicated containing 19 mm G1S plywood backboard.

Part 3 - Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

.3 Install terminal block as required in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install additional pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.2 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00.

.2 Identification Labels: size 2 indicating system name voltage and phase.

END OF SECTION

Part 1 - General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International).

- .1 CAN/CSA-C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CAN/CSA-C22.2 NO. 18.1-13, Metallic Outlet Boxes.
- .3 CAN/CSA-C22.2 NO. 18.2-06(R2016), Non-metallic Outlet Boxes.
- .4 CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.
- .5 CSA C22.2 No. 56-17, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .6 CSA C22.2 No. 83-07(R2017), Electrical Metallic Tubing.
- .7 CSA C22.2 No. 211.2-06(R2016), Rigid PVC (Un-plasticized) Conduit

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.3 Quality assurance submittals:

- .1 Instructions: submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children Products.

Part 2 - Products

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with expanded ends.

.3 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.4 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

.1 One-hole steel straps to secure surface conduits NPS 2 50 mm and smaller.

- .1 Two-hole steel straps for conduits larger than NPS 2 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.2 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for NPS 1 27 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

.4 Steel coupling for life safety systems. Eg. Fire alarm, exit and emergency lighting.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fitting with internal bonding assembly suitable for linear expansion as per Ontario Electrical Safety Code 2018, 27th Edition, Section 12.

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 basements, mechanical and electrical service rooms and in unfinished areas such as attics.

.3 Use rigid hot dipped galvanized steel threaded conduit for surface mounting except were specified elsewhere.

.4 Use electrical metallic tubing (EMT) except in cast concrete above 2.4 m, under slab and in inaccessible ceilings.

.5 Use rigid PVC conduit underground.

.6 Use flexible metal conduit for connection to motors in dry areas, transformers, connection to surface or recessed fixtures.

.7 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.8 Minimum conduit size for lighting and power circuits: 21 mm.

.9 Bend conduit cold:

.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.10 Mechanically bend steel conduit over 21 mm diameter.

.11 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.12 Install fish cord in empty conduits.

.13 Run three 27 mm spare conduits up to accessible ceiling space and two 25 mm spare conduits down to accessible ceiling space from each flush panel.

.1 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.

.14 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.15 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 surface 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 centre 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 27 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 27 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 to provide drainage.

.2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11.

.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 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

.2 Insulated Cable Engineers Association, Inc. (ICEA)

Part 2 - Products

.1 Cable Protection

.1 38 x 140 mm planks, pressure treated with clear wood preservative, copper napthenate or 5% pentachlorophenol solution, water repellent preservative (not creosote).

.2 Cable Markers

.1 Provide yellow warning tape full length of trench. Refer to detail for different services. Tape to read “Danger Electrical Cables”.

Part 3 - Execution

3.1 DIRECT BURIAL OF CABLES

.1 After sand bed specified in Section 31 23 33.01, is in place, lay cables maintaining 75mm clearance from each side of trench to nearest cable. Do not pull cable into trench.

.2 Provide offsets for thermal action and minor earth movements. Offset cables 150 mm for each 60 m run, maintaining minimum cable separation and bending radius requirements.

.3 Underground cable splices not permitted.

.4 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer’s instructions.

.5 Cable Separation

.1 Maintain 75 mm minimum separation between cables of different circuits.

.2 Maintain 300 mm horizontal separation between low and high voltage cables.

.3 When low voltage cables cross high voltage cables, maintain 300 mm vertical separation with low voltage cables in upper position.

.4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables an d150 mm between high voltage cables.

.5 Maintain 300 mm minimum lateral and vertical separation for fire alarm and control cables in upper position.

.6 Install treated planks on lower cables. 6m in each direction at crossings.

.7 After sand protective cover specified in Section 32 23 33.01, is in place, install continuous row of overlapping 38 x 140 mm pressure treated planks interlocking cable blocks to cover length of run.

3.2 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.1 Do not pull spliced cables inside ducts.

.2 Install multiple cables in duct simultaneously.

.3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.4 To facilitate matching of colour coded multi-conductor control cables reel off in same direction during installation.

.5 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

.6 After installation of cables, seal duct ends with duct sealing compound.

3.3 FIELD QUALITY CONTROL

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

.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds. 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 600 V megger 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 at 100% of original factory test voltage in accordance with manufacturer's ICEA recommendations.

.7 Provide Consultant 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.

END OF SECTION

Part 1 – General

1.1 WORK INCLUDED

.1 This section specifies requirements for Clearing and Grubbing for all areas located within project limits and as required to carry out the work to the satisfaction of the Engineer and the Owner.

1.2 RELATED WORK

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

1.3 DEFINITIONS

.1 Clearing consists of cutting off trees and brush, vegetative growth and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

.2 Grubbing consists of excavation and disposal of stumps and roots, brush and vegetative growth hereinafter referred to as debris.

1.4 STORAGE AND PROTECTION

.1 Prevent damage to existing features which are to remain.

.1 Repair any damaged items to approval of Engineer.

1.5 MEASUREMENT AND PAYMENT

.1 Clearing and Grubbing shall not be paid for separately. All costs associated with Clearing and Grubbing are to be included in either the Parking Lot Construction or Access Construction line items in the Schedule of Unit Prices.

Part 2 – Products

2.1 NOT USED

Part 3 – Execution

3.1 PREPARATION

.1 Inspect site and verify with Site Engineer items designated to remain.

.2 Locate and protect utility lines. Preserve in operating condition active utilities.

.3 Notify utility authorities before starting clearing and grubbing.

.4 Place environmental controls as required.

3.2 CLEARING

.1 Clear as required by cutting all trees and brush at a height of not more than 300 mm above ground.

.2 Cut off branches and cut down trees overhanging area cleared as directed by Site Engineer.

.3 Cut off unsound branches on trees designated to remain as directed by Site Engineer.

.4 Cut all trees, regardless of size, into lengths 2.40 meters long.

.5 Relocate or dispose of all cut trees to a location off site the premises.

.6 All cut trees are to become property of the Contractor.

.7 All branches and unsuitable timber and other items resulting from the clearing operation shall be burned without damage to adjacent property, or otherwise disposed of at the Contractor's own expense, as the Site Engineer may direct. Burning shall be in accordance with the Provisions of the Forest Act and Regulations. The Contractor will be responsible for all necessary permits. The Contractor shall take precautions to prevent the fires from spreading and shall be liable for any damages caused in the performance of this work.

3.3 GRUBBING

.1 Grub out stumps and roots to suitable depth so as to ensure that all stumps and roots are completely removed from site.

3.4 REMOVAL AND DISPOSAL

.1 Debris shall become the property of the Contractor and shall be disposed of at the Contractor's own expense off site. Application for acquisition of relevant permits and compliance with applicable laws, regulations and codes shall be the responsibility of the Contractor. A copy of any documents related to the foregoing shall be forwarded to the Site Engineer.

.2 In areas designated as quarantined by the Canadian Food Inspection Agency (CFIA), ensure all CFIA requirements are met.

3.5 FINISHED SURFACE

.1 Leave ground surface in condition suitable for stripping of topsoil to approval of Site Engineer. Topsoil to be stockpiled and protected on site. Owner may at their discretion opt to retain the topsoil on site for their use.

END OF SECTION

Part 1 – General

1.1 RELATED WORK

.1 Section 01 45 00 – Material Testing

.2 Section 32 92 23 – Topsoiling, Seeding and Sodding

.3 Section 33 05 16 - Manholes, Catchbasins and Chambers

.4 Section 02516 – Storm Drainage System and Culverts

1.2 DEFINITIONS

.1 Rock Excavation: is defined as limestone, sandstone, granite or similar rocks in solid beds or masses in original or stratified position, which can be removed only by continuous drilling, blasting or use of pneumatic tools, and all boulders of one cubic meter in volume or larger. All rock excavation must be assessed by the Engineer.

.2 Common Excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation including asphalt, dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and/or excavated with heavy construction equipment. Material which can be excavated with a 35 tonne hydraulic excavator equipped with a 1.0 meter wide bucket with rock teeth or ripper shall be classified as common excavation.

.3 Theoretical Trench Width: is the maximum width that will be applied to an individual pay item under this section. If the Contractors deems that a width greater than the theoretical trench width is necessary, then additional costs are to be included in maximum theoretical trench width. Theoretical trench width for the project will be 1.2 meters.

1.3 PROTECTION OF EXISTING FEATURES

.1 Existing buried utilities and structures:

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing any excavation work, notify applicable owner or authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.

.3 Confirm locations of buried utilities by careful test excavations.

.4 Maintain and protect from damage, water, sewer, electric, telephone and other utilities and structures encountered as indicated. Obtain direction of Engineer before moving or otherwise disturbing utilities or structures. Any damage to such utilities must be repaired to the Engineer’s approval, at the Contractor’s expense.

.5 Advise utility company of requirement to re-route existing lines in area of excavation, if required. All costs for such work will be incorporated into the unit price for each specific item. No extra will be allowed.

1.4 MEASUREMENT AND PAYMENT

.1 Common excavation will be considered incidental to work performed in the related sections.

.2 Exploratory excavations indicated on the drawings will be measured by each excavation conducted. Per each measurement will be full compensation for excavation, handling, backfill and reinstatement to the original condition.

.3 Rock excavation will be measured in cubic meters using the average end area method between changes in rock cross section. Dimensions used to calculate end areas shall be theoretical trench width of 1.2 meters and depth from surface of rock as exposed on sides of trench after excavation to bottom of specified bedding for each pipe trench.

Boulders larger than one cubic meter, any portion of which is within theoretical trench will be classified as rock and measured following removal from trench.

Cubic meter measurement will be full compensation for excavation, disposal, backfill, sandstone replacement, labour and material.

Part 2 – Products

2.1 MATERIALS

.1 Type 1 Fill:

.1 Hand selected, hand placed, excavated material approved by the Engineer, free from shale, clay, friable materials, organic matter and other deleterious substances.

.2 Type 2 Fill:

.1 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.

.3 Type 3 Fill (Granular Bedding):

.1 Granular bedding shall have a maximum particle size of 28 mm and consist of a well-graded, hard, durable, crushed or pit run, coarse sand or gravel that is free of organic matter, chemicals and other impurities.

.2 Following are suggested gradations for granular bedding (the selected gradation(s) should conform to the pipe manufacturer's requirements):

Sieve Size, mm	% Passing, by mass
28	100
20	85 - 100
14	60 - 90
10	25 - 60
5	0 - 10
2.5	0 - 5
1.25	---

.4 Type 4 Fill (Bedding Sand):

.1 Bedding sand shall meet the requirements of Section 402 of Department of Transportation, Infrastructure and Energy "General Provisions and Contract Specifications for Highway Construction."

.5 Type 5 Fill:

.1 Common Term: Class "B" Gravel.

.2 Aggregate Quality: sound, hard durable material free from soft, thin, elongated particles, organic material or other deleterious substances.

.3 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.

.4 Class "B" gravel shall meet the following requirements:

.1 Gradation to be within the following limits when tested to ASTM C136 and giving a smooth curve without sharp breaks and when plotted on a semi-log grading chart.

Sieve Size, mm	% Passing, by Mass
31.5 mm	100
25.0 mm	95 - 100
12.5 mm	50 - 83
4.75 mm	30 - 60
1.18 mm	15 - 43
0.6 um	10 - 35
0.3 um	5 - 26
0.075 um	3 - 7

.5 Los Angeles Abrasion to ASTM C131 maximum percent loss by mass: 50.

.6 The percent of crushed material will be determined on the fraction of particles by mass retained on the 4.75 mm sieve having one mechanically fractured face.

.7 Flat and elongated: max. 20%.

.8 A minimum of 13 percent retained between the 4.75 mm and 0.6 mm sieves.

.6 Type 6 Fill:

.1 Common term: Class "A" Gravel. (Imported)

.2 Aggregate Quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.

.3 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.

.4 Type 6 Fill shall meet the following requirements:

.1 Gradation to be within the following limits when tested to ASTM C136 and giving a smooth curve without sharp breaks and when plotted on a semi-log grading chart.

Sieve Size, mm	% Passing, by Mass
31.5 mm	100
25.0 mm	95 - 100
12.5 mm	50 - 83
4.75 mm	30 - 60
1.18 mm	15 - 40
0.6 um	10 - 32
0.3 um	5 - 22
0.075 um	3 - 9

.2 Los Angeles Abrasion to ASTM C131 maximum percent loss by mass: 35.

.3 The crushed material shall be a minimum of 75 percent by mass retained on a 4.75 mm sieve having 2 or more mechanically fractured faces.

.4 Petrographic number (max.): 150 (as per PEI Dept. of Transportation and Infrastructure Standards).

.5 A minimum of 13 percent retained between the 4.75 mm and 0.6 mm sieves.

.7 Type 7 Drainage Gravel:

.1 Common Term: Class "E" Gravel

.2 Crushed and screened, hard durable stone, free from clay and organic material, graded to have 100% passing the 31.5 mm sieve, and approved by the Engineer.

.8 Filter Fabric: Terrafix 270R or equal.

.9 Hot Mix Asphaltic Concrete:

.1 Hot Mix Asphaltic Concrete shall be as per Section 603 of PEI Department of Transportation, Infrastructure and Energy's document titled, "General Provisions and Contract Specifications for Highway Construction."

.2 Hot Mix Asphaltic Concrete shall be Base "A" and Seal "B" classification.

.3 Asphalt cement shall be supplied and placed as per Section 501 of PEI Department of Transportation, Infrastructure and Energy's document titled, "General Provisions and Contract Specifications for Highway Construction."

Part 3 - Execution

3.1 SITE PREPARATION

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

3.2 STOCKPILING

.1 Stockpile fill materials in areas designated by Engineer. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.3 DEWATERING

.1 Keep excavations free of water while work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

.4 Submit for Engineer's review details of proposed dewatering methods.

3.4 EXCAVATION

.1 Advise Engineer in advance of excavation operations to enable original cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions indicated.

.3 Remove concrete masonry paving walks, demolished foundations, rubble and other obstructions encountered during excavation.

.4 Excavation must not interfere with normal 45-degree splay of bearing from bottom of any footing.

.5 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 at end of day's operation.

.6 Dispose of surplus and unsuitable excavated material off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Engineer when soil at bottom of excavation appears unsuitable and proceed as directed by Engineer.

.10 Obtain Engineer approval of completed excavation.

.11 Remove unsuitable material from trench bottom to extent and depth directed by Engineer.

.12 Where required due to unauthorized over-excavation, correct as follows:

- .1 Fill under bearing surfaces and footings with gravel.
- .2 Fill under other areas with Type 2 fill compacted to minimum of 100% maximum dry density to ASTM D698.

.13 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.5 FILL TYPES AND COMPACTION

.1 Use fill of types as indicated or specified below. Unless otherwise specified, compact to following densities:

.1 Type 1: 100% maximum dry density.

.2 Type 2: 100% maximum dry density.

.3 Type 3 (Granular Bedding): 100% maximum dry density.

.4 Type 4 (Bedding Sand): 100% maximum dry density

.2 Contractor must meet the compaction requirements for the type of fill used. Should settlement occur in the trench during the maintenance period, Contractor will be required to repair settled area and give an additional year of maintenance for that area.

3.6 BACKFILLING

.1 Do not proceed with backfilling operations until Engineer has inspected and approved installations and approved all material to be used in backfilling operations.

.2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing.

.3 Place layers simultaneously on both sides of installed work to equalize loading.

.4 Place material by hand under, around and over installations until 300 mm of cover is provided. Dumping material directly on installations will not be permitted.

.5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.6 .1 All pipe to be imbedded in a Type 4 material to 300 mm above the top of pipe. The remainder of the material is to be Type 2.

.2 Use Type 7 drainage material as required when water is present in the trench and pumping is not adequate to control inflow.

.7 Place filter fabric over top of all Type 7 drainage material.

3.7 RESTORATION

.1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Engineer.

.2 Reinstate pavement, curbs and sidewalks to condition and elevation which existed before excavation.

.3 Clean and reinstate areas affected by work as directed by Engineer.

.4 All roadways and asphalt mixes to meet Prince Edward Island Department of Transportation, Infrastructure and Energy specifications.

END OF SECTION

Part 1 - General

1.1 WORK INCLUDED

.1 Parking Lot Construction specifies requirements for complete parking lot construction.

.2 Parking lot construction includes all clearing, grubbing, excavation, backfilling, compaction, fine grading, supply and placing hot mix asphaltic concrete base and seal materials (including asphaltic cement), gravels, select borrow, premium borrow, sawcutting, culverts, insulation, guiderail, warning signs, construction of drainage swales, and all other required items as specified.

1.2 RELATED SECTIONS

.1 Section 01 35 43 – Environmental Protection

.2 Section 01 45 00 – Materials Testing

.3 Section 31 11 00 – Clearing and Grubbing

.4 Section 32 17 23 – Pavement Markings

.5 Section 32 92 23 – Topsoiling, Seeding and Sodding

1.3 REFERENCE STANDARDS

.1 Province of P.E.I. Department of Transportation, Infrastructure and Energy Standard Specifications titled, "General Provisions and Contract Specifications for Highway Construction" (latest edition).

.2 Transportation Association of Canada Manual of Traffic Control Devices for Canada.

1.4 MEASUREMENT AND PAYMENT

.1 Parking Lot Construction will be based on square meter measurement of asphalt seal placed and will include sawcutting, select borrow, Class “A” gravel, asphalt base, asphalt seal and associated milling and overlap as shown in the “Asphalt Repair Detail.” Unless specified otherwise, gravel sub-base to be 150mm thickness minimum and select borrow to be 300mm thickness. Also included is regrading existing subgrade. Additional material is required to achieve design grade, proof rolling, compaction, backfilling, tree removal, including clearing and grubbing (as directed), 100mm topsoil and hydroseed, environmental measures, etc.

.2 Access Road Construction will be based on square meter measurement of asphalt seal placed and will include sawcutting, select borrow, Class “A” gravel, asphalt base, asphalt seal and associated milling and overlap as shown in the “Asphalt Repair Detail.” Unless specified otherwise, gravel sub-base to be 150mm thickness minimum and select borrow to be 300mm thickness. Also included is regrading existing subgrade. Additional material is required to achieve design grade, proof rolling, compaction, backfilling, tree removal, including clearing and grubbing (as directed), 100mm topsoil and hydroseed, environmental measures, etc.

.3 There shall be no separate payment for planing of existing asphalt materials. Include all costs in the lump sum bid price for Parking Lot Construction.

.4 There shall be no separate payment for sawcutting and planing of asphalt surfaces. Include all costs in the lump sum bid price for Parking Lot Construction.

.5 There shall be no separate payment for the supplying and placing of select borrow and Class "A" gravel materials. Include all costs in the lump sum bid price for Parking Lot Construction.

.6 There shall be no separate payment for fine grading and compaction of any select borrow, premium borrow and Class "A" gravel materials. Include all costs in the lump sum bid price for Parking Lot Construction.

.7 There shall be no separate payment for the supply and placing of tack coat, hot mix asphaltic concrete base and seal materials, including asphalt cement. Include all costs in the lump sum bid price for Parking Lot Construction.

.8 There shall be no separate payment for excavation of any material, the construction of ditches and swales, and the re-use of any material in the form of fill for lots and as structural fill. Include all costs in the lump sum bid price for street construction.

.9 There shall be no separate payment for the supply and placing of environment controls, straw bale check dams, silt fences, and water for dust control. Include all costs in the lump sum bid price for Parking Lot Construction.

.10 Clearing and Grubbing will be paid for as described in Section 31 11 00.

.11 There shall be no separate payment for the supplying and placing of flexbeam guiderail, warning signs, stop signs and posts. Include all costs in the lump sum bid price for Parking Lot Construction.

.12 Topsoil, Seeding and Sodding will be paid for as described in Section 32 92 23.

.13 Excavation and backfill of deficient areas identified by proof roll test shall be paid for separately on a per cubic meter basis.

.14 There shall be no separate payment for drainage swale ditch construction within the project boundary. The Contractor will be responsible for providing positive drainage to prevent pooling around the new parking lot.

Part 2 - Products

2.1 MATERIALS

.1 The suitability and durability of the materials shall be demonstrated to the satisfaction of the Engineer before being accepted into the work. Provide written confirmation of acceptance from materials testing firm.

.2 Premium Borrow (Sandstone):

.1 Composed of clean uncoated particles free from lumps of clay and other deleterious materials.

.2 No more than 15% shall pass the number 75 um sieve and no materials shall be retained on a 100 mm sieve.

.3 That portion of select borrow material passing a 4.75 mm sieve shall have a maximum of 20 percent finer than 75um as tested when delivered to site.

.4 The percent by mass passing the 12.5 mm sieve shall not exceed 75%.

.5 All premium borrow is to contain a sufficient amount of gravel sizes following placement/compaction to ensure stable conditions.

.3 Select Borrow (Sandstone):

.1 Composed of clean uncoated particles free from lumps of clay and other deleterious materials.

.2 No more than 15% shall pass the number 75 um sieve and no materials shall be retained on a 100 mm sieve.

.3 That portion of premium borrow material passing a 4.75 mm sieve shall have a maximum of 30 percent finer than .075 mm as tested when delivered to site.

.4 All select borrow is to contain a sufficient amount of gravel sizes following placement/compaction to ensure stable conditions.

.4 Class “A” Gravel:

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.

.2 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.

.3 Class "A" gravel shall meet the following requirements:

.1 Gradation to be within the following limits when tested to ASTM C136 and giving a smooth curve without sharp breaks and when plotted on a semi-log grading chart.

ASTM Sieve Designation	**% Passing by Mass**
31.5 mm	100
25.0 mm	95 - 100
12.5 mm	50 - 83
4.75 mm	30 - 60
1.18 mm	15 - 40
600 um	10 - 32
300 um	5 - 22
75 um	3 - 9

.2 Los Angeles Abrasion to ASTM C131 maximum percent loss by mass: 35.

.3 The crushed material shall be a minimum of 75 percent by mass retained on a 4.75 mm sieve having 2 or more mechanically fractured faces.

.4 Petrographic number (max): 150.

.5 Class “B” Gravel:

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.

.2 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.

.3 Class "B" gravel shall meet the following requirements:

.1 Gradation to be within the following limits when tested to ASTM C136 and giving a smooth curve without sharp breaks and when plotted on a semi-log grading chart.

ASTM Sieve Designation	**% Passing by Mass**
31.5 mm	100
25.0 mm	95 - 100
12.5 mm	50 - 83
4.75 mm	30 - 60
1.18 mm	15 - 43
600 um	10 - 35
300 um	5 - 26
75 um	3 - 7

.2 Los Angeles Abrasion to ASTM C131 maximum percent loss by mass: 50.

.3 The crushed material shall be a minimum of 50 percent by mass retained on a 4.75 mm sieve having 1 mechanically fractured face.

.6 Class 1 R-5 Rip Rap:

.1 Class 1 R-5 Rip Rap shall meet the requirements as outlined in Section 213 of the document, “General Provisions and Contract Specifications for Highway Construction.”

.7 Hot Mix Asphaltic Concrete:

.1 Hot Mix Asphaltic Concrete shall be supplied and placed as per Section 603 of the document titled, "General Provisions and Contract Specifications for Highway Construction."

.2 Hot Mix Asphaltic Concrete shall be Base "A" and Seal "B" classification.

.3 Asphalt cement shall be supplied and placed as per Section 501 of the document titled, “General Provisions and Contract Specifications for Highway Construction.”

.8 Tack:

.1 All tack coats shall be supplied and placed as per the document titled, "General Provisions and Contract Specifications for Highway Construction."

.2 Tack coat, supplied and placed, shall adhere to Section 601 of the above specifications and Table 503-1 meeting requirements of SS-1h type.

.9 Topsoil:

.1 Topsoil shall meet requirements outlined in Section 32 92 23 - Topsoiling, Seeding and Sodding.

.10 Water for Dust Control:

.1 Water for Dust Control shall meet requirements as outlined in Section 802 of the document, "General Provisions and Contract Specifications for Highway Construction".

.11 Concrete Pipe:

.1 Concrete pipe shall be precast reinforced concrete and shall meet the design and fabrication requirements of Class III reinforced concrete pipe as outlined in ASTM C76.

.12 DWP Pipe:

.1 DWP pipe shall meet Transportation & Infrastructure specifications Section 301 and shall be double-walled polyethylene (DWP).

.13 PVC Pipe:

.1 PVC pipe shall be used for pipe up to 450 mm diameter. All PVC pipe shall be integral gasketted bell and spigot joints that meets requirements of CSA B182.1 and CSA B182.2.

.14 Insulation:

.1 All insulation shall be HI-40 insulation as supplied by Dow Chemical of Canada Ltd. An alternate acceptable material is Formular 400 as supplied by Celfortec Inc.

.15 Signs:

.1 Extruded aluminum as per CSA 109.1 M as prepared by CSGB.

.2 Stop sign dimensions: 600 mm x 600 mm – five (5) required.

.3 One (1) Checkerboard sign required: 750mm x 750mm.

.4 (a) Posts to be 14-gauge steel complying with ASTM A653, hot dipped galvanized conforming to coating designation G-90.

(b) Post to be 50mm x 50mm square with 11mm diameter holes at 25mm c/c on four sides. Length as required to provide 1500mm bury.

.16 Culvert End Treatment:

.1 Culvert end treatment shall meet requirements as outlined in Section 312 of the document titled, “General Provisions and Contract Specifications for Highway Construction”.

.17 Bollards:

.1 Bollards to be hollow steel pipes.

.2 150 mm diameter, 2.4 meters long, 12 mm wall thickness.

.3 Concrete 35 MPa, Class 3.

.4 Painted red.

.18 Flexbeam Guiderail:

.1 Guiderail shall meet requirements as outlined in Section 903 of the document, "General Provisions and Contract Specifications for Highway Construction."

.2 Galvanized steel to AASHTO M180, hot dipped, including nuts, bolts and washers.

.3 Posts – as per Transportation and Infrastructure Standards. Pressure treated wood, 200mm x 150mm x 1644mm, minimum.

Part 3 - Execution

3.1 PARKING LOT CONSTRUCTION

.1 Environmental Controls:

.1 Supply and place straw bale check dams where required.

.2 Supply and place of silt fences as required in Environmental Protection Plan (See Special Provisions) and as shown on drawings.

.3 Straw bale check dams will be required in existing ditches and in newly constructed ditches along and at other locations as identified on site by the Engineer. Supply and place straw bale check dams to requirements outlined in Section 801 "Check Dams" as outlined in the document titled, "General Provisions and Contract Specifications for Highway Construction."

.4 Silt fences are to be supplied and placed to requirements described in Section 806 "Silt Fences" as outlined in the document titled "General Provisions and Contract Specifications for Highway Construction."

.5 Mulching shall be required for areas disturbed as a result of construction activities. Mulching shall be supplied and placed to requirements as outlined in Section 805 "Mulching" as outlined in the document "General Provisions and Contract Specifications for Highway Construction."

.2 Clearing and Grubbing:

.1 Clear and grub all vegetation and trees located within the parking lot right-of-way and drainage ditch easement. Clearing and grubbing shall be carried out in accordance with Section 31 11 00 – Clearing and Grubbing.

.3 Excavation:

.1 Excavate to required depths as shown on drawings. Carry out all excavation using hydraulic excavators and trucks.

.2 Unless otherwise directed by the Owner, the Contractor shall become the owner of all unsuitable excavated material required in street construction. All unsuitable material is to be removed from site and disposed of by the Contractor. All other material to be placed on lots as directed by the Owner.

.3 Surplus topsoil shall be placed on low lots as directed on site. The Contractor is to reuse all suitable excavated material within the immediate project limits and on any adjoining lots for blending and providing positive drainage.

.4 Sandstone (Select Borrow):

.1 Backfill with approved sandstone material. A minimum amount of 300 mm of sandstone material will be required for parking lot construction.

.2 In areas where more than 300 mm of sandstone material is required to meet design grades, the Contractor shall use additional sandstone materials or structural fill approved by the materials engineer.

.3 Prior to placing sandstone, carry out a "Proof Roll" test on subgrade material. The proof roll test shall consist of the following and shall be taken in the presence of the Materials Engineer.

.1 Prepare a fully loaded tandem truck.

.2 Drive truck along the entire street area in a longitudinal manner. Cover the entire area with no more than 2.0 meters between each line of wheel tracks.

.3 Observe deflection on subgrade in a continuous manner. If deflection at any location is greater than 5mm or if excessive cracking occurs, obtain direction from Engineer.

.4 Excavate to a lower elevation at locations as identified by the Engineer. All excavations shall be tapered from original grade at a 5 horizontal to 1 vertical ratio.

.5 For the purpose of this project, the following allowances have been included with regards to the “Proof Roll” test.

.1 Excavate and remove from site an additional volume of 500 cubic meters of material that is deemed unsuitable by the Engineer. Depths and areas shall be as directed by the Engineer.

.2 Supply and place an additional in place volume of 500 cubic meters sandstone to replace excavated material described above.

The above allowances of excavation of unsuitable material, and the supply and placing of sandstone shall not be used in locations where existing and new pipes are present. It will be the Contractor’s responsibility to ensure proper trench compaction prior to placement of sandstone.

.4 Place sandstone in 150mm thick lifts unless directed otherwise by the Engineer. Compact to a 100 percent Standard Proctor Density.

.5 Shape and roll alternately to obtain a smooth, even and uniform compacted layer.

.6 The shaping and compaction operation shall continue until the surface conforms to the specified requirements and shall be repeated as required to maintain the surface until it is covered by gravel material.

.7 The maximum acceptable deviation from grade at any location shall be 15mm above or below that specified; however, deviations consistently above or below specified grades will not be accepted.

.8 Confirm all sandstone material has been placed to required lines and grades prior to placing Class "A" gravel.

.9 If truck traffic is utilizing areas where sandstone and select borrow has been placed, excavate the top of material to remove potentially contaminated material. Replace and regrade as required.

.5 Backfill (Class “A” Gravel):

.1 Place Class "A" gravel in required lifts to obtain compaction of 100% Standard Proctor Density.

.2 Shape Class "A" gravel and roll alternately to obtain a smooth, even and uniformly compacted layer. Continue this process until the surface conforms to specified requirements and repeat as required to maintain the surface until it is covered with pavement material.

.3 The maximum acceptable deviation from grade at any location shall be 10 mm above or below that specified under all cases, design thickness of materials shall be achieved.

.6 Daily Operations:

.1 Maintain adequate traffic control to permit safe entrance and exit for construction workers and travelling public.

.2 On a continuous basis, remove all contaminants, silt, clay, borrow, topsoil and all other materials from the existing paved surfaces located within the adjacent driveways and roads.

.3 Wash all existing paved surfaces two times daily to remove items outlined above using high pressure washer. Extend 200 m each way.

.4 Provide Water for Dust Control on a continuous basis. Apply water to control dust as required by the Owner and Engineer.

.7 Asphalt Placement:

.1 Plane along edge of existing road to permit placing of asphalt base and seal materials. Plane a minimum of 500mm to permit second lift of asphalt base placement and a further 1,000mm to permit seal placement.

.2 Prior to placing hot mix asphaltic concrete base and seal materials, saw cut in a neat, straight line for the entire width of all streets, including approach radius (wings) for the full thickness of the base and seal material. This is required in order to provide a straight, clean and fresh face to abut new asphalt material against existing material.

.3 Place Tack Coat to requirements as outlined in Section 601 “General Provisions and Contract Specifications for Highway Construction.”

.4 Supply and place hot mix asphaltic concrete base and seal materials to requirements as outlined in Section 603 of “General Provisions and Contract Specifications for Highway Construction.”

.8 Culvert Installation:

.1 Supply all concrete pipe, PVC and DWP pipe and insulation materials as required.

.2 Excavate to lines and grades as shown on drawings.

.3 Where required, place insulation for full length of pipe and extend past ends two meters on each end. Place at 1.2 m width continuously.

.4 Place pipe and backfill to standards outlined in section 305 "Roadway Culvert Installation - General Provisions and Contract Specifications for Highway Construction" and as outlined on plans.

.5 Perform culvert end treatment as outlined in Section 312 "Culvert End Treatment - General Provisions and Contract Specifications for Highway Construction."

.9 Bollards:

.1 Place steel bollards, 1.2 m bury. Fill with concrete and paint.

.10 Drainage swale:

.1 Clear and grub as required.

.2 Excavate ditch with sideslope 2.5 horizontal to 1.0 vertical to required lines and grades.

.3 Supply and place topsoil and hydroseed/sod as specified.

.11 Signs:

.1 Supply and place stop signs at all newly constructed intersections.

.12 Flexbeam Guiderail:

.1 Erect flexbeam guiderail as per Section 903 – Erection of Flexbeam Guiderail, as outlined in "General Provisions and Contract Specifications for Highway Construction."

END OF SECTION

Part 1 – General

1.1 DESCRIPTION

.1 The work under this specification includes all labour equipment and material necessary to layout and paint the pavement markings.

.2 This section includes the supply and placing of paint to be applied for traffic lines, parking lines and walkways, including cross-hatch areas and gore areas.

.3 This section also includes the supply and placing of paint for symbols.

.4 It is the intent of this section that all paint lines, cross hatch areas, gore areas and symbols presently on site be replaced to their original location following placement of new asphalt materials.

1.2 RELATED SECTONS

.1 Section 32 01 01 – Parking Lot Construction

1.3 MEASUREMENT FOR PAYMENT

.1 Pavement markings to be measured on a lump sum basis and shall include all labour, material and incidentals necessary to complete the work. This item will also include the removal and replacement of all signage.

Part 2 – Products

2.1 MATERIALS AND WORKMANSHIP

.1 The Contractor shall provide written confirmation that the materials as installed shall be guaranteed to remain in place for a period of 2 years, while being subjected to traffic and normal summer and winter pavement maintenance procedures.

2.2 MATERIALS

.1 Paint

- .1 To CGSB 1-GP-74M, alkyd traffic paint.
- .2 To CGSB 1-GP-149M, alkyd reflectorized traffic paint.
- .3 Colour: to CGSB 1-GP-12C, yellow 505-308, white 513-301, Blue and Orange Colour: Lafrentz Road Marking Skid Resistant Material (SRM).

.2 Thinner to CAN/CGSB 1.5.

.3 Glass Beads:

- .1 Overlay Type: to CGSB 1-GP-74M.
- .2 Premix Type: to CGSB 1-GP-149M.

Part 3 – Execution

3.1 EQUIPMENT

.1 Paint applicator of an approved pressure type distributor capable of applying paint in single and dashed lines and that will ensure uniform application and a positive means of shut-off.

3.2 PAVEMENT MARKING DRAWINGS

.1 Where a pavement parking drawing is provided, the Contractor is required to paint markings as indicated on the Drawing. Where a pavement parking drawing is not provided, the Contractor is to accurately inventory existing markings by topographic survey methodologies and reinstate new markings at original location. Obtain approval from Engineer on inventory drawing prior to cold milling / removal of existing pavement markings.

3.3 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.

.2 Visually inspect substrate in presence of Engineer.

.3 Proceed with Work only after unacceptable conditions have been rectified.

3.4 CONDITION OF SURFACES

.1 Pavement surface to be dry, free from surface water, frost, ice, dust, oil, grease and other foreign materials.

3.5 APPLICATION

.1 Remove all incorrectly painted pavement markings by grinding, resulting in minimal scaring and removal of at least 95% of existing marking. Remove markings in such a way that the pavement surface is not damaged below a depth of 3mm. Grooving, rutting, or other significant damage is not acceptable.

.2 Pavement marking layout by Contactor and to be approved by the Engineer and/or owner.

.3 Unless otherwise approved by the Engineer apply paint only when air temperature is above 10^{o}C and no rain is forecast. Surface of pavement must be dry and free of dirt, dust, grease and other contaminants which could be detrimental to bond.

.4 Do not use thinner unless approved by Engineer.

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

.6 Symbols and letters to conform to dimensions indicated in Uniform Traffic Control Devices of Canada.

.7 Apply other specified marking materials directed by Engineer.

.8 Unless otherwise directed by Engineer, paint lines must be of a uniform line width of 100 mm and of uniform colour and clearly defined edges, without noticeable overspray of adjacent road surfaces. Paint shall be applied at a rate to achieve a dry thickness of 10 mils. Paint marking shall be fast-dry and not track 10 minutes after application.

.9 Thoroughly clean distributor tank before refilling with paint of different colour.

.10 Lines not painted in accordance with these specifications shall be repainted by the Contractor at the expense of the Contractor.

.11 The Contractor shall inform the Engineer of the Contractor's daily schedule to enable the Engineer to be present as they deem necessary during loading and painting operations.

3.6 TOLERANCE

.1 Paint markings to be within ± 12 mm of dimensions specified.

.2 Remove incorrect markings in accordance with Engineer's instructions.

3.7 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

.2 Repair damage to adjacent materials caused by pavement marking applications.

3.8 REAPPLICATION

.1 All pavement markings are to be applied to the following requirements:

.1 48 hours and 30 days after placing asphalt seal material.

END OF SECTION

Part 1 – General

1.1 DESCRIPTION

.1 This section specifies requirements for working around existing trees during the course of construction. The work shall include protective zone requirements, fence protection, strapping of trunks, protection and pruning of roots, excavation and backfill requirements.

1.2 DEFINITIONS

.1 Maximum transplantable size: An existing tree shall be considered to be larger than the maximum transplantable size when its trunk is greater than 100 millimetres in diameter. This assumes conventional transplanting methods and equipment is being used. The definition precludes the use of larger specialized equipment used to move trees larger than 100 mm in diameter which may be affected by construction activities and a decision to relocate specific trees.

1.3 MEASUREMENT AND PAYMENT

.1 Items under this section will not be paid for separately but shall be considered incidental to the work required to complete the project.

Part 2 – Products

2.1 STRAPPING

.1 Strapping required for the protection of tree trunks of existing trees shall consist of wood slat snow fencing fastened securely around the tree trunk and wrapped with yellow or orange warning or marking tape. Alternately, use wooden planks with a minimum size of 25 x 150 x 2440 millimetres spaced at 75 to 100 mm around the trunk of the tree and securely fastened.

2.2 FENCING

.1 Fencing shall be a minimum height of 1.5 m and of heavy-duty construction of either snow fencing or flexible rubber-coated chain link material supported by metal T-bar or a minimum of 50 mm x 50 mm wooden stakes at a minimum spacing of 1.5 m apart to provide a rigid barrier around the tree.

2.3 MULCH

.1 Natural bark mulch or wood chips to be used where a protective cover is required over the roots to avoid compaction.

Part 3 – Execution

3.1 CONSTRUCTION METHODS

.1 Undertake all protective measures for trees and shrubs, beyond the maximum transplantable size, as indicated on the drawings and as specified herein. Trees less than the maximum transplantable size shall be protected similarly or relocated as required.

3.2 IDENTIFICATION AND REMOVAL

.1 Prior to the award of the contract, the Engineer will have identified all those trees that may be impacted by the construction activities.

3.3 TREE PROTECTION AND PROTECTIVE ZONE

.1 Where possible, establish a protective zone for all trees and shrubs to be preserved on site.

.2 Trees involved within the construction area shall have a 2.0 m radius protective zone calculated from the circumference at the base of the trunk which will remain free of excavation, trenching, grade changes, stock piling of materials and soil compaction throughout the duration of the project.

.3 Protective rigid fencing installed around these areas is required.

.4 Protect roots of trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

3.4 STRAPPING OF TREE TRUNKS

.1 Where it is not possible to establish a minimum 2.0 m protection zone around a tree or group of trees that are to be preserved within and adjacent to proposed construction areas strapping will be required.

.2 This requires a double wrap of wood slat snow fencing, or other suitable wood planks (minimum 50 mm x 100 mm) spaced 75 to 100 mm around the trunk strapped to the trunk of the trees to protect the tree trunk from construction impact damages.

3.5 EXCAVATION AND BACKFILL AT THE BASE OF TREES

.1 Minimize stripping of topsoil and vegetation around the base of trees and shrubs to be preserved.

.2 Augering under existing trees may be an acceptable method of underground installations. Alternatively, air spade technology may be employed for trenching to minimize root damage.

.3 During excavation, protect exposed roots of trees and where open trenches are required. Where the roots of trees are damaged during excavation, torn or broken roots to be hand pruned to flush cuts.

.4 Any other excavation within the 2m radius protective zone to be approved by an Engineer.

.5 Where heavy traffic with construction equipment is anticipated, the Engineer may require a protective layer of mulch 100-150 mm in depth applied around the bases of the trees to avoid compaction of surface roots.

.6 Excavated trees, holes, shafts, and trenches associated with construction efforts, and involving exposed roots from adjacent publicly owned trees, shall be kept moist in the hot and dry weather to prevent roots desiccation. Shading is acceptable where water use is unsafe. If required, moist burlap can be used to cover exposed roots to avoid drying out.

3.6 ROOT PRUNING

.1 In the event of major reconstruction efforts, ensure that root pruning be done along the length of the work in an approved manner, such as with a trencher, chain saw, hand saw, lopping, shears or pruners.

.2 Keep roots disturbance to a minimum during excavation.

.3 A clean severance of the root system is required. Minor root removal, when necessary, shall be done according to approved techniques.

.4 Where major roots come into conflict, the Engineer shall be contacted for input.

.5 Roots shall not be torn off with power equipment.

3.7 LIMB AND BRANCH PROTECTION

.1 Trees and limbs overhanging the construction area shall not be damaged.

.2 If the tree canopy height needs to be raised to allow for reasonable construction clearances, the work shall be performed under the direction of a qualified person using proper arboriculture practices.

.3 All tree pruning work shall be performed according to the safety standards as prescribed under the PEI Occupational Health and Safety Act.

3.8 REMEDIAL REPAIR WORK TO TREES

.1 During the course of construction, immediately notify the Engineer of any significant damage to a tree or trees.

3.9 TREES DAMAGED, REMOVED OR LOST DUE TO CONSTRUCTION

.1 Trees removed without prior authority from the Engineer, shall be replaced at the Contractor’s expense.

.2 In general, destroyed trees are to be replaced at the rate of one tree for every tree lost with a minimum size of 60 mm calliper measured 15 cm from the base of the tree.

.3 The location and species of replacement trees is to be similar to that which was damaged by construction.

.4 In the event that trees that are larger than the maximum transplantable size are destroyed or damaged, costs may be deducted from monies otherwise due as determined by the Engineer.

3.10 QUALITY CONTROL AND FINAL INSPECTION

.1 Final Inspection:

.1 Prior to substantial performance of the contract where trees have been damaged, the Engineer shall arrange for a final inspection of all trees on the project with the Contractor.

.2 All repair/replacement monies due as a result of tree damage by the Contractor may be deducted from monies otherwise due.

END OF SECTION

Part 1 – General

1.1 WORK INCLUDED

.1 This section specifies requirements for topsoiling, seeding and sodding. Work includes finish grading, supply and placing of topsoil, seed and sod and all appurtenances required to complete the work to the satisfaction of the Engineer.

1.2 RELATED SECTIONS

.1 Section 01 35 43 – Environmental Protection

.2 Section 31 23 33 – Excavating, Trenching and Backfilling

1.3 REFERENCE STANDARDS

.1 CAN/CGSB 16.2 M Emulsified Asphalts, Anionic Type, for Road Purposes.

.2 Canadian Nursery Trades Association; Canadian Standards for Nursery Stock.

1.4 DELIVERY AND STORAGE

.1 Schedule deliveries to minimize storage at job site without causing delays.

.2 Deliver, unload and store sod on pallets.

.3 Schedule sod delivery to coincide with topsoil operations.

1.5 MEASUREMENT AND PAYMENT

.1 There will be no measurement for payment under this section. Topsoiling, seeding and sodding required will be considered incidental to the project. All costs should be considered and included in the respective line item in the Schedule of Unit Prices.

Part 2 – Products

2.1 TOPSOIL

.1 Friable loam containing minimum of 4% organic matter for clay loams and 2% for sandy loams to maximum of 20% by volume and having a pH of 5.5 to 7.5. Topsoil containing subsoil, roots and stones larger than 50 mm, weeds, couch grass, crabgrass, foreign objects or toxic materials is not acceptable.

2.2 FERTILIZER

.1 Complete commercial, specially blended for promoting root development of newly seeded or sodded areas.

.2 Formulation ratio: 1:2:2 spring seeding

1:4:4 fall seeding

2.3 LIME

.1 Agricultural grade ground limestone containing total 85% carbonates and graded as follows:

Sieve Designation	Cum. % Passing
14 000	90
160	50

2.4 SEED

.1 Canada #1 lawngrass mixture to Government of Canada Seeds Regulations where applicable having minimum germination of 80% and minimum purity of 85%. Seed mixture: 40% Kentucky Blue Grass; 40% Creeping Red Fescue; 20% Perennial Rye Grass.

2.5 HYDRAULIC SEED MULCH

.1 Wood or wood cellulose fibre, free of germination or growth inhibiting ingredients and forming blotter like ground cover allowing absorption and percolation of water.

2.6 WATER

.1 Clean, fresh, and free from impurities that inhibit plant growth.

2.7 SOD

.1 Cultivated turf grass containing not less than 40% Kentucky Bluegrass, free of weeds, and with no surface soil visible when mowed to height of 50 mm; soil portion of uniform thickness, not more than 15 mm and to Section 17 of the Canadian Standards for Nursery Stock. All sod must be nursery sod.

2.8 ACCESSORIES

.1 Pegs: wood, 25 mm x 25 mm x 200 mm nominal size.

.2 Mesh: 37 mm chicken wire or plastic.

Part 3 – Execution

3.1 FIELD CONDITIONS

.1 Do not perform work under adverse field conditions, such as frozen ground or ground covered with snow, ice or standing water, without prior approval.

3.2 PREPARATION

.1 Grade subgrade to eliminate uneven areas and rough spots, and to ensure positive drainage. Remove all debris, roots, branches, stones in excess of 50 mm diameter, and other deleterious materials. Remove any subsoil that has been contaminated with toxic materials. Dispose of contaminated material off site.

.2 Cultivate area to depth of 100 mm prior to placing topsoil.

.3 Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING TOPSOIL

.1 Do not spread topsoil until subgrade has been inspected by Engineer.

.2 Spread topsoil in uniform layer over dry subgrade where seeding or sodding is indicated. Do not place topsoil on frozen subgrade.

.3 Keep topsoil 15 mm below finished grade for sodded areas.

.4 Apply topsoil to depth of 100 mm unless otherwise indicated.

.5 Fine grade topsoil to lines and elevations indicated, leaving surface smooth and uniform with a fine loose texture. Obtain approval of topsoil grade and depth before proceeding with seeding or sodding.

3.4 APPLICATION OF LIME AND FERTILIZER

.1 Apply lime at a rate of 50 kg per 100 square meters or at a rate determined by soil analysis. Mix lime thoroughly into full depth of topsoil prior to application of fertilizer.

.2 For dry seeding and sodding apply fertilizer with mechanical spreaders over entire area of topsoil at nitrogen rate of 500 g/100 m² or at a rate determined by soil analysis.

3.5 DRY SEEDING

.1 Seed during local growing season when natural moisture is available to ensure germination and growth.

.2 Apply seed with mechanical spreader at a rate of 2 kg/100 m2 or as recommended by seed manufacturer. Cover and roll with a roller having a mass of 50 kg/m of width.

3.6 SODDING

.1 Lay sod as soon as possible after lifting to ensure proper establishment.

.2 Place sod in rows perpendicular to slopes, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections.

.3 Roll sod with a roller having a mass of 50 kg/m of width. Repeated rolling to correct irregularities in grade is not permitted.

.4 Water within 4 hours of placing to obtain moisture penetration through sod into top 100 mm of topsoil.

.5 For slopes steeper than 1:2, place mesh over topsoil. Secure mesh in place with pegs and cover mesh lightly with topsoil. Lay sod and secure with pegs. Place pegs 100 mm below top edges using 3 pegs per meter. Drive pegs flush with surface of root mat.

3.7 HYDRAULIC SEEDING

.1 Seed during local growing season when natural moisture is available to ensure germination and growth.

.2 Measure all quantities of material by weight or by weight- calibrated volume measurement.

.3 Charge seeder with water, and while agitating, slowly add mulch, seed, fertilizer and lime until all components are thoroughly mixed.

.4 When required, add erosion control agent to seeder and mix thoroughly to complete seeding slurry.

.5 Slurry application per 100 m2:

.1 Seed – 2.0 kg or as recommended by seed manufacturer.

.2 Fertilizer – 500 g of nitrogen.

.3 Mulch = 10 kg.

.4 Erosion Control Agent – as recommended by manufacturer.

.5 Water – minimum 100 litre.

.6 Lime – as determined by soil analysis.

.6 Apply slurry uniformly, blending into grassed areas.

.7 Remove slurry from items and areas not designated to be sprayed.

3.8 MAINTENANCE

.1 Water adequately to assure continued growth. Control water to prevent washouts.

.2 Mow grass to height of 60 mm when it first reaches a height of 80 mm. Maintain at height of 50 70 mm for two more mowings. Remove clippings which could smother grass.

.3 Fertilize grassed areas after first mowing.

.4 If grass is damaged for any reason (ie., road salt), the Contractor will be required to replace and fertilize for one year after initial sodding.

3.9 ACCEPTANCE

.1 Grassed areas will be accepted upon completion of third mowing provided that:

.1 Growth is properly established.

.2 Area is free of bare and dead spots and without weeds.

.3 No surface soil is visible when grass has been cut to a height of 60 mm.

.2 Area sodded or seeded in the fall will be accepted the following spring one month after start of growing season providing that acceptance conditions are fulfilled.

.3 Continue maintenance and mowing until acceptance.

END OF SECTION

Part 1 – General

1.1 WORK INCLUDED

.1 This section specifies requirements for the construction of precast concrete manholes and catchbasins. Work includes supply and installation of concrete bases, precast sections, metal castings and testing.

1.2 RELATED WORK

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

.2 Section 33 40 00 – Storm Drainage Systems and Culverts

1.3 MEASUREMENT AND PAYMENT

.1 All new catchbasins will be measured on a per unit basis and shall include the catchbasin, frame, cover and all labour and materials required for complete installation.

1.4 REFERENCE STANDARDS

.1 ASTM C478M Precast Reinforced Concrete Manhole Sections (Metric).

.2 CGSB 56 GP 4 Sealing Compound, Sewer Pipe Joint, Cold Applied, Mineral Filled, Bituminous.

1.5 HANDLING AND STORAGE

.1 Prevent damage to materials during storage and handling.

Part 2 – Products

2.1 GENERAL

.1 Manholes and catchbasins shall be constructed of precast concrete sections as per ASTM C478M, "Standard Specifications for Precast Reinforced Concrete Manhole Sections."

.2 The diameter of the manholes/catchbasins is to be as shown on the drawings and details.

.3 All storm manholes/catchbasins are to have a minimum of 300 mm sump complete with a solid precast reinforced concrete bottom.

.4 a) Catchbasins shall be concrete structures complete with integral base. Diameter to be as indicated on drawings. These will be topped with grade rings to reduce the diameter to 600 mm.

b) Catchbasins required for yard laterals shall be 450 mm dia. structures without sumps. These structures shall be known as “Sluice Box.”

.5 Joints between the grade rings and frame are to be sealed with single component, hydrophobic, flexible sealant/adhesive, such as XSEAL by Fernco, or approved equal. Butyl rubber gaskets such as RAMNEK are permitted for use on intermediate structure sections.

.6 All manholes are to be the same diameter from top to bottom and shall be either concentric or eccentric in shape at the top and are to be supplied with a minimum of 200mm of grade rings (but not more than 450mm) and made up of as few as possible grade rings.

.7 All manholes are to be installed so that the top of the concrete structure, including grade rings and cover, are level with the finished grade. Sloped rubber grade rings are to be used where required to ensure covers sit flush with the road surface especially on a crowned surface.

.8 All manholes are to be watertight where located in ditch inverts, swales or when they cannot be kept at grade for other reasons. All manholes are to be externally waterproofed with self-adhered SBS rubberized membrane, elastomeric bitumen emulsion or rubberized asphalt emulsion products from bottom of base to the top of all adjuster rings. Bakor Blueskin WP200 or approved equal shall be used for this application, installation to be as per manufacturer's instructions and shall include primer and all other appurtenances required to complete the work to the satisfaction of the Engineer.

.9 In the case of a failed Vacuum or Water test on a structure, leaks are to be sealed on the interior of the structure using a hydrophobic polyurethane grout, such as HyperFlex by Fernco or approved equal. Only grouting of seems shall be permitted. External piping entering a manhole is to be sealed using a common cement surface grout. Vacuum or Water testing is to be performed without the use of common cement surface grout on the interior of the structure.

.10 All manholes located in remote locations are to be locked at the discretion of the Utility.

2.2 FRAMES AND COVERS

.1 Round catchbasin covers shall be IMP R 11 600 mm diameter not less than 140 kg mass.

.2 Round manhole covers shall be IMP R 10, 600 mm diameter not less than 145 kg mass.

.3 Dome grate covers shall be IMP R-30, 500 mm diameter, not less than 95 kg mass.

.4 All manholes located completely or partially in asphalt or concrete shall be supplied with a C-56M Floating Frame and IMP R-10 cover. Installation of floating frame is to be complete with a 50mm layer of wetted bentonite chips around joint where the two parts overlap to provide a waterproof barrier. Floating frame and cover shall be adjusted such that when set to finished grade that the frame is in the middle of its adjustment range.

2.3 GRADE RINGS

.1 Grade rings 75mm or larger are to be precast reinforced concrete; grade rings less than 75mm must be of recycled rubber as manufactured by Highway Rubber & Safety Inc.

2.4 INFLOW DISH

.1 Manufactured of high-density polyethylene to ASTM D-1248, Class A, Cat. 5.

.2 Dish to be equipped with ventilation valve and corrosion resistant nylon strap for easy removal and reinstallation into manhole frame.

.3 Standard of Acceptance – Cretex Inflow Dish.

.4 Inflow dishes will be provided by Owner.

Part 3 – Execution

3.1 EXCAVATION AND BACKFILL

.1 Excavate and backfill in accordance with Section 31 23 33.

.2 Obtain approval of Engineer before installing manholes and catchbasins.

3.2 INSTALLATION

.1 Construct units in accordance with details indicated, plumb and true to alignment and grade.

.2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.

.3 Pump excavation free of standing water and remove soft and foreign material before placing concrete base.

.4 Cast bottom slabs directly on undisturbed ground or when permitted by Engineer, set precast concrete base on 150mm minimum of well compacted granular material.

.5 For precast units:

.1 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.

.6 For sewers:

.1 Place stub outlets and bulkheads at elevations and in positions indicated.

.2 Bench to provide a smooth U-shaped channel. Side height of channel to be 0.75 times diameter of sewer. Slope adjacent floor at 1 on 10. Curve channels smoothly. Slope invert to establish sewer grade.

.7 Place frame and cover on top section to elevation indicated. If adjustment required use concrete ring. Maximum depth of concrete rings allowed is 450mm. Number of rings to be kept to a minimum.

.8 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

3.3 INSTALLATION IN EXISTING SYSTEM

.1 Maintain service or obtain approval for alternate arrangement.

.2 Support existing pipe during installation of base.

3.4 TESTING

.1 Test manholes.

.2 Provide labour, equipment and materials required to perform testing.

.3 Backfill prior to testing.

.4 Notify Engineer 24 hours in advance of proposed test. Do test in presence of Engineer.

.5 Water Testing: Perform test as follows:

.1 Plug all inlet and outlet pipes with watertight plugs.

.2 Fill with water to top of precast sections.

.3 Allow time for initial absorption.

.4 Measure and record volume of water required to maintain level for one hour.

.5 Leakage not to exceed 5.0 litres per hour per metre of height above groundwater, per meter of diameter.

.6 Locate and repair defects if test fails. Retest.

.7 Repair visible leaks regardless of test results.

.6 Vacuum Testing: Perform Test as follows:

.1 Plug all inlet and outlet pipes. Restrain plugs.

.2 Place and seal vacuum tester head on the manhole frame.

.3 Draw vacuum of 250mm (10in) Hg on the manhole and measure the time for the vacuum to drop to 225mm (9in) Hg.

.4 Time to be not less than 45, 50, 65, and 80 seconds for manhole diameters of 1050mm, 1200mm, 1500mm, and 1800mm respectively.

.5 For manholes deeper than 6 meters, increase test times by 2 seconds per 300mm of additional manhole depth.

.6 Locate and repair defects if test fails. Retest.

.7 Repair visible leaks regardless of test results.

END OF SECTION

Part 1 – General

1.1 WORK INCLUDED

.1 This section specifies requirements for supply and constructing storm drainage system and culverts. Work includes supply and installation of pipe, fittings and connections.

1.2 CERTIFICATES

.1 Submit manufacturer's test data and certification that products and materials meet requirements of this section.

.2 All materials must be new.

1.3 HANDLING AND STORAGE

.1 Handle and store pipe and fittings in such manner as to avoid shock and damage. Do not use chains or cables passed through pipe bore.

.2 Store gaskets in cool location, out of direct sunlight, and away from petroleum products.

1.4 MEASUREMENT AND PAYMENT

.1 Storm drainage system, including excavating and backfilling, will be measured horizontally in meters for each size of pipe supplied and installed. The unit bid price per meter shall include full compensation for all materials and labour required to complete the work.

.2 There shall be no separate pay item for storm drainage removal or abandonment. Include all costs in the per unit meter bid price for each pipe.

Part 2 – Products

2.1 GENERAL

.1 Diameter, material, strength class and dimensional ratio of pipe and fittings: as indicated.

2.2 CONCRETE PIPE AND FITTINGS

.1 Pipe and Fittings:

.1 Non-reinforced: to ASTM C 76M or CAN/CSA A257.1.

.2 Reinforced: to ASTM C 76M or CAN/CSA A257.2.

.2 Joints: bell and spigot with flexible rubber gaskets to CAN/CSA A257.3-M.

2.3 PLASTIC PIPE AND FITTINGS

.1 Type PSM Polyvinyl Chloride: to CAN/CSA B1800.

.2 Profile PVC sewer pipe and fittings: to CAN/CSA B1800, profile as indicated in project documents.

.3 Joints: bell and spigot with locked-in rubber gasket.

2.4 HDPE PIPE AND FITTINGS

.1 Double walled HDPE: to CAN/CSA B1800 with smooth interior surfaces.

.2 Fittings: bell and spigot as indicated.

2.5 UNDERGROUND WARNING TAPE

.1 Warning tape shall be polyethylene with a message approved by the Engineer.

Part 3 – Execution

3.1 PREPARATION

.1 Carefully inspect products for defects and remove defective products from site.

.2 Ensure that pipe and fittings are clean before installation.

3.2 TRENCHING, BEDDING AND BACKFILLING

.1 Do trenching, bedding and backfilling to Section 31 23 33.

3.3 PIPE INSTALLATION

.1 Lay and joint pipe and fittings as specified herein and according to manufacturer's published instructions.

.2 Lay pipe and fittings on prepared bed, true to line and grade indicated within the following tolerances:

.1 Horizontal Alignment: 25 mm.

.2 Vertical Alignment: the lesser of 3mm or one half the rise per pipe length.

.3 Commence laying at outlet and proceed in upstream direction with bell ends facing upgrade.

.4 Prevent entry of bedding material, water or other foreign matter into pipe. Use temporary watertight bulkheads when pipe laying is not in progress.

.5 Install gaskets in accordance with manufacturers published instructions. During cold weather, store gaskets in heated area to assure flexibility.

.6 Align pipe carefully before joining. Do not use excessive force to joint pipe sections.

.7 Support pipes as required to assure concentricity until joint is properly completed.

.8 Keep pipe joints free from mud, silt, gravel or other foreign material.

.9 Avoid displacing gasket or contaminating with dirt, petroleum products or other foreign material. Remove, clean, reinstall and lubricate gaskets so disturbed.

.10 Complete each joint before laying next length of pipe.

.11 Where deflection at joints is permitted, deflect only after the joint is completed. Do not exceed maximum joint deflection recommended by pipe manufacturer.

.12 At structures provide flexible joint not more than 300 mm from outside face of structure.

.13 Cut pipe as required for fittings or closure pieces, square to centerline, and as recommended by manufacturer.

.14 Make watertight connections to manholes and catch basins. Use non shrink grout when suitable gaskets are not available.

.15 Place underground warning tape 1.0 meter directly above storm main. Where main is shallow, the minimum cover over the tape shall be 500 mm.

END OF SECTION