

**Rehabilitation of the drainage
infrastructure (syphons nos
1@3, spillways 1@ 3 and the
workshop ditch), located at
the Chambly Canal**

Technical Specifications

Project Number: CCHM-896



Prepared for:
Parks Canada Agency

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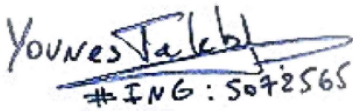
Issued for tender

July 15th, 2020

Sign-off Sheet

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END OF SECTION

GENERAL SECTIONS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 14 00 – Work Restrictions

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.
- .2 **Civil works** covered by this contract consist of the repair (or even reconstruction) of the drainage infrastructure of the Chambly Canal, including syphons nos 1 to 3, weirs nos 1 to 3 and the workshop ditch along the Canal and certain private residences, and include, without limitation, the following activities:
- .1 Demolition work, off-site transportation and disposal of various materials to an authorized disposal facility;
 - .2 Completion of activities before starting works, including field visits, taking photos and videos of the sites, exploration wells, locating buried services before digging, preparatory works including the protection of the existing services to be preserved and land to be protected due to their archaeological character and particularities, the installation of temporary environmental and pumping measures, temporary cofferdams, etc.;
 - .3 Installation of underground infrastructure and related;
 - .4 Backfill excavations, first with excavated soil that is deemed "clean" and has permissible geotechnical properties, then with imported soil to the infrastructure level, using materials that meet the specifications in this document, and according to specifications on plans
 - .5 Leveling, foundation laying of granular materials and bituminous paving as well as the installation of fences and other elements, as shown on the plans;
 - .6 Grassing works;
 - .7 Complete cleaning within the boundaries of the work and disposal of waste materials outside the property of Canada Parks. including snow removal from facilities (work sites, site and temporary parking lots, storage places, etc.), etc.
 - .8 Protection and prevention measures to prevent any damage to existing buildings, structures and developments on the site;
 - .9 All other related work for a complete and functional work and all ancillary work which, although are not specified in this specification, is customary and necessary for the completion of the work required to complete it for the use to which they are intended, including the restoration of places as before works

- .3 **The environmental works** covered by this contract consist of the environmental rehabilitation of Chambly Canal sites and include, but are not limited to, the following activities
- .1 Excavation, transportation and disposal of non-hazardous residual materials that may be encountered during excavation work
 - .2 Excavate, transport and dispose of non-hazardous residual materials encountered during excavation operations;
 - .3 Excavations to bottom level of projected excavations
 - .4 In the case that contaminated soil is found on the site, the Contractor must plan transportation and elimination of excavated soil exceeding applicable criteria or below applicable criteria but not suitable for reuse on-site as backfill to a disposal site authorized by the Quebec's ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC);
 - .5 Full cleaning within the boundaries of the work and disposal of waste materials outside the property of Canada Parks.
 - .6 In the event that vertical cracks are observed in the foundations of the buildings during the excavation work, the contractor will fill the cracks by injecting a seal compatible with the foundation materials and suitable for the installation conditions (for example: temperature);
 - .7 Protection and prevention measures to avoid any damage to buildings, structures and existing facilities on the site
 - .8 All other related work for a complete and functional work and all ancillary work which, although are not specified in this specification, is customary and necessary for the completion of the work required to complete it for the use to which they are intended.
 - .9 For further details concerning the work, refer to the characterization report is presented in Appendix A.
- .4 **The structural work** which is the subject of this contract consists in the supply and installation of materials including labor, equipment and machinery, and includes, without being limited to, the following activities:
- .1 Repairs type 1 (without overlay);
 - .2 Repairs type 2 (with overlay);
 - .3 Reconstruction of concrete components;
 - .4 Replacement and addition of guardrails;
 - .5 Demolition of old power plant pillar;
 - .6 Crack repair
 - .7 Cracks injection;
 - .8 Consolidation with sand-cement bags;

- .9 Excavation, transportation and disposal of non-hazardous residual materials that may be encountered during excavation work ;
- .10 Replacement of planks;
- .11 Grassing works;

- .12 All incidental expenses required for the completion of the work.

- .5 **The electrical work** covered by this contract consists of the supply and installation of materials including labor, equipment and machinery, and includes, but is not limited to, the following activities:
 - .1 Concrete duct systems including ducts, concrete, supports, shapes, shoring, hardware and accessories;
 - .2 Underground ductwork;
 - .3 Draw wells, frames and buffers;
 - .4 Excavation and backfilling of trenches;
 - .5 Drilling of building foundations;
 - .6 Shaft chucking of ducts and ductwork;
 - .7 Incidental expenses required to complete the work.

1.3 WORK SEQUENCE

- .1 Plan and provide all extraordinary measures required by government recommendations for Covid-19 (Coronavirus). The Contractor must include in their prices all extraordinary costs required.
- .2 Execute the work in such a way that PCA can use and have access to the “Parts warehouse” building near the outlet of siphon no. 1 as well as to the exterior back yard for storage of materials., continuously during the works.
- .3 The Contractor must plan and supply a sufficient number of work teams (with materials and machinery required) to simultaneously perform several works in different sectors
- .4 Coordinate Progress Schedule and coordinate occupancy with Canada Parks Representative during construction of **which do not harm navigation in the Canal. For this purpose, the work must be carried out after October 23, 2020 and completed before April 23, 2021**
- .5 Maintain fire access/control. also provide the means of fire fighting.
- .6 The Contractor is responsible for obtaining all necessary permits for the realization of the work from the authorities concerned.
- .7 The Contractor shall provide signalers for all work sites and their durations, especially during obstructions in the Canal cycle path as well as on Route 223 (with request for obstruction permit to be made to the MTMDET) for the works at Siphon no 3.

- .8 In addition, the Contractor must provide deadlines for suppliers of materials, including approximately 10 weeks for siphon # 1 in precast reinforced concrete.
- .9 Field work shall not exceed 100 days.

1.4 OWNER OCCUPANCY

- .1 The Parks Canada Agency (PCA) may have to occupy buildings for the duration of construction. However, part of the outdoor courtyard used for storage will not be completely occupied by PCA for this period.
- .2 Cooperate with PCA in scheduling operations to minimize conflict and to facilitate PCA usage.
- .3 In order to preserve the access of PCA employees to the site, an opening may be made if necessary in the fence of the outdoor storage area for materials of the yard downstream of siphon # 1 to give access to the works of the ditch of the Workshops (points to be confirmed in autumn 2020 with PCA) before the start of work. This opening must have a door with hinge and locking system
- .4 Pedestrian access must always be maintained to the building ‘‘Parts warehouse’’ as well as as long as possible for the cycle path on the dike downstream of the siphon. However, PCA employees must comply with the Contractor's health and safety criteria when they must have access to the site.

1.5 EXISTING SERVICES

- .1 The Contractor shall establish the location of all public and private underground utilities prior to the commencement of works by calling on specialized firms (Info-excavation and/or other private companies). If deemed necessary, hydrovac shall be used to visually confirm the position of underground utilities prior to digging.
- .2 When necessary, the Contractor shall relocate any existing equipment (underground or otherwise) that could affect the safe execution of the works. The Contractor shall replace, at its own expense, any equipment (underground or otherwise) that was not intended to be dismantled and that was damaged during the execution of works. Upon completion of works, the Contractor shall ensure that all equipment is functional.
- .3 Any works related to disconnecting/reconnecting, securing or temporarily re-routing public utilities (overhead or underground) shall be executed in accordance with applicable codes, standards and regulations, and shall be coordinated with the companies or the municipality that owns such service lines, and all requirements that they issue to this effect must be complied with in full.
- .4 Any works related to disconnecting/reconnecting, securing or temporarily re-routing private service lines (overhead or underground) shall be executed in accordance with applicable codes, standards and regulations, and shall be coordinated with PCA management via Stantec Consulting Inc.

- .5 During works specified in points 3 and 4, the Contractor shall maintain safe distances from electrical equipment as specified by the CNESST or other relevant regulatory bodies.
- .6 If it is not possible to maintain safe distances from electrical equipment as specified by the CNESST, or if overhead power lines pass over areas to be excavated or near them and could be affected by the works, such equipment must be secured or temporarily re-routed, ensuring minimal service interruptions for connected customers. Once rehabilitation works have been completed, re-routed equipment must be returned to their original location, ensuring minimal service interruptions.
- .7 The Contractor is fully responsible for the safety and stability of overhead and/or underground utilities for the full duration of the works and must select appropriate protective measures in accordance with type and sequence of planned work.
- .8 Notify PCA and utility companies of intended interruption of services and obtain required permission. The Contractor shall inform, in writing, the PCA representative of selected protective measures 72 hours prior to the execution of these works.
- .9 Provide temporary services to maintain critical building and occupant systems, including the building " Parts warehouse " and its occupants
- .10 Record locations of maintained, re-routed and abandoned service lines.
- .11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders.
 - .5 Other Modifications to Contract.
 - .6 Field Test Reports.
 - .7 Copy of Approved Work Schedule.
 - .8 Health and Safety Plan and Other Safety Related Documents.
 - .9 Other documents as specified.

1.7 CONTRACT DOCUMENTS

- .1 All work mentioned in the tender documents (plans, specifications, price schedule, addenda, etc.) are integral parts of the contract. All portions and sections of the contract are complementary to one another. The General Contractor and specialized contractors

SUMMARY OF WORK

shall take into account all the requirements of each of the sections of these specifications and tender documents when carrying out works.

END OF SECTION

WORK RESTRICTIONS

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 56 00 – Temporary Barriers and Enclosures.

1.2 ACCESS AND EGRESS

- .1 The Contractor shall visit the site at least five (5) business days prior to the commencement of works to mark the ground to indicate work areas so that these can be kept free of vehicles, materials or other. Parks Canada Agency shall be responsible for ensuring that vehicles are moved out of the area marked by the Contractor.
- .2 The Contractor shall provide locks for access points and ensure they are of the same series used by Parks Canada to facilitate access control.
- .3 An access must always be maintained for PCA employees so that they have access to their facilities. The Contractor must coordinate the work according to this requirement. PCA employees must still comply with the Contractor's health and safety criteria and vice versa.

1.3 USE OF SITE AND FACILITIES

- .1 Maintain existing services to building and provide for personnel and vehicle access.
- .2 Where security is reduced by work provide temporary means to maintain security.
- .3 Plan and provide all extraordinary measures required by government recommendations for Covid-19 (Coronavirus). The Contractor must include in their prices all extraordinary costs required.
- .4 The Contractor shall supply and maintain adequate sanitary facilities for its staff. Use of P The Contractor shall provide signalers for all work sites and their durations, especially during obstructions in the Canal cycle path as well as on Route 223 (with request for obstruction permit to be made to the Ministry of transports of Quebec) for the works at Siphon no 3.
- .5 The Contractor shall provide signalers for all work sites and their durations, especially during obstructions in the Canal cycle path as well as on Route 223 (with request for obstruction permit to be made to the Ministry of transports of Quebec) for the works at Siphon no 3.
- .6 Weir no. 3: The Contractor must take note and use rolling equipment according to the structural capacity of the bridge limited to only 10 tonnes.
- .7 Weir no 3: The Contractor must take into consideration that other Contractors mandated by PCA will finalize stabilization works on the canal dikes by the end of April 2020.

WORK RESTRICTIONS

landscaping will remain in autumn 2020 (including installation of a bench along the cycle path and near the wall).

- .8 Siphon no. 2: The Contractor could access the work site via the path of the bicycle path along the Canal. He must return the premises under the same initial conditions and at his expense.
- .9 Workshop ditch: The Contractor must remove and dispose of the trees indicated on the plan, if required. The trees must be identified at the start of the project and approved by the client and the Representative of Parks Canada. He will have to replant other species of trees, in accordance with plans and specifications. All pruning and stump removal activities must be preauthorized by PCA and performed by a specialized firm and in the presence of PCA.
- .10 The Contractor must remove and dispose of all Phragmites in accordance with environmental standards as well as plans and specifications.

1.4 EXISTING SERVICES

- .1 The Contractor shall locate all public and private underground utilities prior to the commencement of works by calling on specialized firms (Info-excavation and/or other private companies). If deemed necessary, hydrovac shall be used to visually confirm the position of underground utilities prior to digging.
- .2 Notify the Canada Parks Representative and utility companies of intended interruption of services and obtain required permission. The Contractor shall inform, in writing, the Canada Parks Representative of selected protective measures 72 hours prior to the execution of these works.
- .3 Provide the circulation for staff and vehicular.
- .4 Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

1.5 SPECIAL REQUIREMENTS

- .1 Submit schedule of works to the Canada Parks Representative at least seven (7) days before start of work.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic, and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.

1.6 EXCLUSION ZONE

- .1 Provide a trunk protection device around certain trees to be protected for this purpose (such as cottonwood or others) near the work to be done. The recommended method is stipulated in the BNQ standard, landscaping using plants. In addition, a geotextile membrane with granular material with a minimum thickness of 300mm above it must be

installed in the area of 3 meters around the trunk to avoid damaging the root system of the tree. These two protective measures must be carefully removed after the work is completed in order to restore the site to its initial state.

1.7 EXCAVATION ALONG THE FOUNDATIONS OF HISTORIC BUILDINGS

- .1 Since the foundations of historic buildings are fragile, no more than three (3) linear metres of foundation should be uncovered at a time during excavation works.

1.8 VIBRATION CONTROL

- .1 Control vibrations when using a soil compaction vibrator, percussion equipment and rock-removal equipment, and when performing excavation work near buildings. When this type of equipment is used or this type of work is carried out within 30 metres of existing structures that must be preserved, the particle velocity in the soil located in immediate proximity to the structure must be kept within the following ranges on any of the three wave components (vertically, horizontally or diagonally):
 - .1 Frequency \leq 10 Hz: 3 mm/sec
 - .2 10 Hz < frequencies \leq 30 Hz: 10 mm/sec
 - .3 Frequencies > 30 Hz: 12 mm/sec
- .2 The Contractor must enlist the services of a vibration control firm to ensure that proper measures are taken to protect structures at the site. For works near buildings on the site and over City of Montreal sewer collection pipes situated on the site, the firm must measure vibratory waves using a sufficient number of seismographs (minimum of four) on the structures requiring protection that are nearest to the equipment or work (e.g., building foundations, manholes, snow chute, etc.). No vibratory wave measurements are required on the Mill Street right-of-way. If seismographs cannot be installed in existing manholes, the Contractor shall install a concrete block in the ground at approximately two (2) meters deep. The seismograph must be installed on this concrete block to monitor vibrations. The firm specializing in vibratory wave control must determine the type of concrete and the maximum size of the block or determine an equivalent method. The concrete block must be removed upon completion of works.
- .3 Vibratory wave measurements must be done before the start of the work to measure the current vibrations that will serve as a basis for comparison. During work execution, waves must be continuously recorded.
- .4 The Contractor shall prepare and submit to the Canada Parks Representative a detailed weekly report covering the recording of the vibrations caused by the equipment or works carried out near structures requiring protection. The report must include the following:
 - .1 Seismograph location, distance between seismographs, location of works, and the shortest distance between structures requiring protection and the location of works;

WORK RESTRICTIONS

- .2 A copy of each recording and the recordings for peak vector sum in mm/s, particles and frequencies;
- .3 A summary of damage caused (with support photos), if any;
- .4 The signature of the person in charge.
- .5 The report must be accompanied by the recording film with an indication of the nature, direction and size of each of the components contributing to the peak vector sum.
- .6 A copy of this report must be immediately submitted to the Canada Parks Representative.

1.9 SMOKE-FREE ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

END OF SECTION

DESCRIPTION OF ITEMS IN UNIT PRICE TABLE

Note 1: The units of the payment methods are indicated in the unit price of the submission slip. They include but are not limited to: the supply of materials and labor, as well as their transportation and installation, the specific measures depending on the nature of the work, codes and professional standards required. The quantities indicated must be approved in advance by the Engineer and the PCA Representative.

Note 2: The Contractor must add in each item of the tender form entitled "General expenses..." to plan and provide all the extraordinary measures required according to government recommendations for Covid-19 (Coronavirus), and this, for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

1 Syphon 1 sector

1.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

1.1.1 General expenses, mobilization, demobilization, traffic maintenance, taking videos of the inventory and signaling

1.1.1.1 This item includes the mobilization and demobilization of personnel and equipment on site, the implementation of all health / safety requirements, obtaining permits and permit fees, coordination and procedures at the City of Chambly for works in the municipal right-of-way, all costs for board and lodging and subsistence, installation and maintenance of the construction trailer, chemical toilets, fences, supply and the installation of a new chain link barrier or an opening in the existing fence for temporary access to the site (if required), including concrete, posts, bars, fasteners, wire fencing. This item also includes the installation and maintenance of temporary signage in accordance with the standards of the Ministry of Transport of Quebec, including temporary signage, coordination with authorities, survey fees, picketing of works and fees. statements that are not charged to any item on the price schedule, site security costs (if necessary), supply and installation of vibration control measures during the work in accordance with the CCDG of the Ministry of Transport of Quebec, the protection of existing public utilities in the work zones as well as all the other elements required by the "Tender Documents".

1.1.1.2 This item also includes the supply and installation of materials for the construction of temporary cofferdams in water streams (ditches and canal) in the required places including those shown on the plans.

1.1.1.3 The lump-sum bid price for the work under this item is payable on the following terms:

1.1.1.3.1 An initial payment of 30% of the lump-sum bid price for this item is payable once general mobilization is complete.

1.1.1.3.2 A second payment of 50% of the lump-sum bid price for this item is payable on a prorated basis according to the work estimate.

1.1.1.3.3 The balance of the lump-sum bid price for this item is payable once general demobilization is complete.

1.1.2 Environmental procedures

1.1.2.1 The price of this item is a lump-sum amount for all expenses incurred by the Contractor for environmental procedures, in accordance with the instructions in this contract.

1.1.2.2 The price includes but is not limited to the following:

1.1.2.2.1 Everything described in Section 01 35 43, Environmental Procedures, including preparation, presentation and implementation of the environmental procedures plan; preparation, presentation and implementation of the spill control plan; preparation, presentation and implementation of the location plan for the various site facilities; preparation, presentation and implementation of the work zone plans; preparation, presentation and implementation of the air pollution control plan; preparation, presentation and implementation of the contamination prevention plan; preparation, presentation and implementation of the wastewater management plan; preparation, presentation and implementation of the wetlands and historical, archeological, cultural and biological resources identification and protection plan; measures to protect the existing tree and plants; temporary facilities to prevent pollution; preparation, presentation and implementation of a site historical and heritage value protection plan.

1.1.2.3 The lump-sum bid price for this payment item is payable on the following terms:

1.1.2.3.1 An initial payment of 20% of the lump-sum bid price for this item is payable once implementation of the protection plans is complete.

1.1.2.3.2 The other progress payments under this item will be charged on each invoice at a percentage in line with the general progress of work on that invoice.

1.1.3 Winter conditions

1.1.3.1 The price for this item is a global lump-sum amount for all expenses incurred in installing the necessary facilities for performance of the work in cold weather, as well as costs not included in other payment items in the Bid Form, in accordance with the specifications.

1.1.3.2 The price includes but is not limited to the following:

1.1.3.2.1 Preparation, presentation and correction, if required, of the description of facilities. Snow removal.

1.1.3.2.2 Mobilization of labour, tools and equipment required for performance of the work;

1.1.3.2.3 Supply, handling and transportation of materials required to build the facilities;

1.1.3.2.4 Installation, maintenance during the work and dismantling of temporary facilities upon work completion;

1.1.3.2.5 Heating of temporary facilities during the work;

1.1.3.2.6 Transportation of materials off-site;

1.1.3.2.7 Any incidental expenses.

1.1.3.2.8 Winter conditions are payable only if required, in writing, by the Parks Canada Representative.

1.1.3.2.9 The bid price shall be paid as follows:

- 1.1.3.2.10 60 % of the amount after assembly of facilities to the Parks Canada Representative's satisfaction;
- 1.1.3.2.11 40 % of the amount after removal from the site of materials used in building the facilities.
- 1.1.4 Support of the excavation walls and the warehouse downstream side of the syphon 1
- 1.1.4.1 The price is a lump sum. This item includes support for the excavation walls, as well as all special measures to ensure integrity of the soil, as well as the structures and infrastructure of neighbouring properties and buildings on the property.
- 1.1.5 Sufficient supply and installation of pumps where required
- 1.1.5.1 The price is a lump sum. This item includes the supply of pumps to direct the water from the ditch upstream of the syphon 1 downstream as well as the transfer of water from the canal to the downstream while respecting environmental standards for the protection of wildlife, as well as all other required places shown or not on the plans
- 1.1.5.2 This item also includes, if necessary, the measures for lowering the water table below the level of its base of the syphon and / or culvert.
- 1.1.5.3 The Contractor must provide the pumping system plans to the Parks Canada representative before the start of work for approval
- 1.1.6 Relocation and reinstallation of equipment and installation in the workshop area
- 1.1.6.1 The price is a lump sum. This item includes temporary relocation off site of all equipment in the work zone and reinstallation of this equipment to the satisfaction of Parks Canada representative.
- 1.1.7 Archaeological protection including 300 mm thick stone path with geotextile membrane
- 1.1.7.1 The price is an amount payable per square meter of " protective stone pad "required and approved beforehand by the PCA Representative. This item includes everything described in section 013543b as well as the placement of a 300 mm thick stone pad including geotextile separating it from the existing terrain
- 1.1.8 Measure of disposal of off-site soils including storage site, temporary stacking, waiting 84 hr and disposal according to MELCC criteria
- 1.1.8.1 While preparing the prices for this tender, the Contractor must consider that in certain localized areas the soils in place are of category B-C and > C in terms of their contamination. This compensation constitutes full compensation for the loading and placing in piles of contaminated materials, the supply and installation of protective membranes, the piles and ballasting equipment, the segregation or sieving of waste, all costs of sampling and analysis (one analysis per 100 tonnes).
- 1.1.8.2 The price is an amount payable per cubic meter of "this type of soil" required and approved in advance by the Engineer and the APC Representative

1.2 CONSTRUCTION

- 1.2.1 Excavation of the walls of the canal

- 1.2.1.1 The price is a lump sum. This item includes full compensation for the removal of the excavation of the walls of the existing Canada, the backfilling of part of the existing dike while ensuring the stability of the dike, the piling of the materials to be reused as well as the disposal of materials off-site, in a site that meets the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".
- 1.2.2 Demolition and disposal of the existing syphon
- 1.2.2.1 The price is a lump sum. This item includes full compensation for the removal of syphon # 1, the loading and off-site disposal of materials in a site that complies with the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".
- 1.2.3 Purchase of syphon no. 1 (4 m wide by 1.3 m high) including head walls, wing walls and cut-off walls
- 1.2.3.1 The price is a lump sum. This item constitutes full compensation for the order and supply of the reinforced concrete syphon 1 with galvanized steel including the accessories (including the head walls, wing walls and cut-off walls, the seals installed by the manufacturer in the factory), the transportation and off-site disposal of excavated materials in a site that complies with the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".
- 1.2.3.2 The Contractor must provide for approval shop drawings signed and sealed by an Engineer member of the OIQ, for new works (Syphon # 1 etc.).
- 1.2.4 Installation of syphon 1
- 1.2.4.1 The price is a lump sum. This item constitutes full compensation for the unloading and installation of the syphon including the installation of walls and accessories as well as the supply and installation of the base (required depending on the loads and the bearing capacity of the SOIL), as well as all the other elements required by the "Tender Documents".
- 1.2.5 Coating
- 1.2.5.1 The price is an amount payable per cubic meter of coating. This item includes the supply and installation of granular materials, spreading, embedment of works and compacting of granular materials, structural adjustments, as well as all the other elements required by the "Tender Documents".
- 1.2.6 Additional sealing of the syphon
- 1.2.6.1 The price is an amount payable per square meter of surface to be sealed. This item includes the supply and installation of the special waterproofing membranes (on the 3 exterior faces and on the bottom face inside the syphon) on each joint between the sections of the syphon (as shown in plans), as well as all the other elements required by the "Tender Documents".
- 1.2.7 Riprap protection
- 1.2.7.1 The price is an amount payable per square meter of surface to be stoned. This item includes the supply and installation of protective stones, structural adjustments, downstream and upstream of the syphon1 as well as all the other elements required by the "Call documents of offers".

1.2.8 Final restoration of the bottom of the canal

1.2.8.1 The price is an amount payable per square meter of surface at the bottom of the canal to be rehabilitated. This item includes the supply and installation of the required materials as well as the leveling, shaping and compaction of the bottom of the canal to complete its rehabilitation before work, as well as all the other elements required by the "Tender Documents".

1.2.9 Reconstruction of the canal walls (including spanning the slopes of the canal, bicycle path, path, fence, etc.)

1.2.9.1 1.2.4.1 The price is a lump sum. This item includes the supply and installation of materials for the reconstruction of the canal walls as shown on the plans including the geotextile membrane and geomembranes, the riprap of the canal slopes, the bicycle path, the fence and others installations dismantled during the excavation, as well as all the other elements required by the "Tender Documents".

1.2.10 Supply and installation of the retaining wall

1.2.10.1 The price is an amount payable per square meter of wall surface to be built. The Contractor must supply and install a block retaining wall, including the supply of a workshop plan for the nested concrete block retaining wall proposed, signed and sealed by an engineer member in good standing of the Order engineers from Quebec. The nominal lifespan of the wall and all its components must be 75 years. The contractor must consider that the installation of a drain for drainage behind the wall is permitted but that the proposed retaining wall must not include anchors or inclusions. The contractor must consider for the design of the structure that the acceptable differential, longitudinal and transverse settlements are 1%. The structure must be made of precast concrete blocks designed to resist slipping and to maintain a uniform slope. Slip resistance can be provided by the shape of the block or by studs. The wall must be designed in accordance with the requirements of CAN / CSA S6 "Canadian code for the calculation of highway bridges". For the seismic calculation, the acceleration ratio "A" must be that of appendix A3.1 of this CSA standard. The minimum depth of the plug is 400 mm and if the ground is frost-resistant, the depth of the plug must provide protection against frost. In addition, the depth of the plug must also take into account the slope of the ground in front of the wall. Nested concrete blocks must be gray in color.

1.2.10.2 The price covers in particular the creation of exploration wells near the wall, the design, temporary support, supply and installation of all materials, including the foundation, foundations, drain and trench draining, geotextile, studs, excavations, styrofoam, geogrids if required, backfilling, transport, and it includes any incidental expense for a complete installation and complying with the requirements of contractual documents.

1.2.11 Reprofiling of Simard stream downstream of syphon 1

1.2.11.1 The price is an amount payable by the linear meter of stream reprofiled. This item constitutes full compensation for the reprofiling of the stream, including excavation, loading, transportation as well as the off-site disposal of surpluses in a site that meets the requirements of the MELCC, the supply and placement of materials such as shown on the plans, as well as all the other elements required by the "Tender Documents".

1.2.12 Reconstruction of culverts downstream of syphon 1 by rectangular pipe (3 m wide x 1.74 m high)

1.2.12.1 The price is an amount payable per linear meter of new rectangular culvert. This item constitutes complete compensation for the excavation and demolition of existing culverts and the existing service road, the supply and installation of a culvert including accessories, additional sealing, excavation and draining of trenches, foundation, embedment, backfilling and reconstruction of the service road, transport and off-site disposal of excavated materials in a site that meets the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".

1.2.13 Repair of the workshop courtyard

1.2.13.1 The price is a lump sum. This item includes the supply, installation of materials and all the other elements required for the restoration of the workshop courtyard as it exists before work.

1.3 FINAL REPAIR WORK FOLLOWING THE THAW

1.3.1 Rehabilitation of topsoil surfaces and seeding

1.3.1.1 The price is an amount payable per square meter of damaged plant area and approved beforehand by the PCA Representative. This item constitutes complete compensation for the preparation of the soil, the supply and implementation of topsoil, including the spreading of fertilizer, seeding according to the method designated and approved by the Parks Canada representative as well as the initial maintenance work, as well as all the other elements required by the "Tender Documents".

1.3.1.2 The area payable to the Contractor is that measured in place, once the work has been completed. Any excess on the lines defined by Parks Canada Representative on the site is at the Contractor's cost.

2 Spillway 1

2.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

2.1.1 Item 2.1.1: General expenses, mobilization, demobilization, traffic management, taking vidéos of the inventory and signaling

2.1.1.1 This item includes mobilization and demobilization of personnel and equipment to and from the site, implementation of all health/safety requirements, application for permits, payment of permit fees, arrangements and coordination with the City of Chambly for work in the municipal right-of-way, all board, lodging and subsistence expenses, installation and maintenance of site trailer, chemical toilets, fences, supply and installation of new chain link fence or opening in the existing fence for temporary site access (if required and which will have to be closed at the end of the work), including concrete, posts, bars, fasteners and grating. This item also includes installation and maintenance of temporary signage in accordance with MTQ standards, including temporary signage, coordination with authorities, surveying and staking out of structures, and survey expenses not included in other items of the Bid Form, site security services (if necessary), supply and installation of vibration control measures during the work

according to CCDG of MTQ, protection of existing public utilities in the work zones and all other items required in the Bid Documents.

2.1.1.2 This item also includes the supply and installation of materials for the construction of temporary cofferdams in watercourses (ditches and canal) in the required places including those shown on the plans.

2.1.1.3 The lump-sum bid price for the work under this item is payable on the following terms:

2.1.1.3.1 An initial payment of 30% of the lump-sum bid price for this item is payable once general mobilization is complete;

2.1.1.3.2 A second payment of 50% of the lump-sum bid price for this item is payable on a prorated basis according to the work estimate;

2.1.1.3.3 The balance of the lump-sum bid price for this item is payable once general demobilization is complete.

2.1.2 Item 2.1.2 Environmental procedures

2.1.2.1 The price in payment item 2.1.2 of the Bid Form is a lump-sum amount for all expenses incurred by the Contractor for environmental protection, in accordance with the instructions in this contract.

2.1.2.2 The price includes but is not limited to the following:

2.1.2.2.1 Everything described in Section 01 35 43, Environmental Procedures, including preparation, presentation and implementation of the environmental protection plan; preparation, presentation and implementation of the spill control plan; preparation, presentation and implementation of the location plan for the various site facilities; preparation, presentation and implementation of the work zone plans; preparation, presentation and implementation of the air pollution control plan; preparation, presentation and implementation of the contamination prevention plan; preparation, presentation and implementation of the wastewater management plan; preparation, presentation and implementation of the wetlands and historical, archeological, cultural and biological resources identification and protection plan; measures to protect the existing tree and plants; temporary facilities to prevent pollution; preparation, presentation and implementation of a site historical and heritage value protection plan.

2.1.2.3 The lump-sum bid price for this payment item is payable on the following terms:

2.1.2.3.1 An initial payment of 20% of the lump-sum bid price for this item is payable once implementation of the protection plans is complete;

2.1.2.3.2 The other progress payments under this item will be charged on each invoice at a percentage in line with the general progress of work on that invoice.

2.1.3 Item 2.1.3 Winter conditions

2.1.3.1 Item 2.1.3.1 - Temporary Shelter for Concrete

2.1.3.1.1 Payment item 2.1.3.1 of the *Bid Form* is priced per linear meter (Lin. m.) to offset all costs incurred for the temporary shelter of pre-concrete and concrete work for different types of repair and reconstruction, in accordance with the requirements of the plans and specifications.

- 2.1.3.1.2 Temporary shelter is payable only if it is required in writing by the Parks Canada Representative.
- 2.1.3.1.3 Price includes, but is not limited to, the following:
- 2.1.3.1.3.1 The preparation, presentation, and correction of the shop drawings and the description of the shelter.
 - 2.1.3.1.3.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.1.3.1.3.3 The supply, handling and transportation of the materials required to construct the shelter;
 - 2.1.3.1.3.4 Installation, maintenance during construction and dismantling at the end of the temporary shelter;
 - 2.1.3.1.3.5 Heating of the temporary shelter during the work;
 - 2.1.3.1.3.6 Off-site transportation of materials;
 - 2.1.3.1.3.7 Any incidental expenses.
- 2.1.3.1.4 The bid price is paid as follows:
- 2.1.3.1.4.1 60% of the amount after assembly of the shelter to the satisfaction of the Parks Canada Representative.
 - 2.1.3.1.4.2 40% of the amount after the evacuation of the materials that made up the shelter, outside the construction site.
- 2.1.3.1.5 The price includes the equivalent of the intervention length regardless of the number of installations and relocations required. Only the equivalent of the intervention length will be paid. If the contractor places two shelters at two different heights on the same 1 m repair section, a single 1m shelter will be paid and not 2 m.
- 2.1.3.2 Item 2.1.3.2 – Insulator (RSI 0.40 per layer)
- 2.1.3.2.1 Payment item 2.1.3.2 of the *Bid Form* is priced per square meter (m²) of new concrete without formwork covered by an insulator, in accordance with the requirements of the drawings and specifications.
- 2.1.3.2.2 Insulator layers are paid only if required, in writing, by the Parks Canada Representative;
- 2.1.3.2.3 Price includes, but is not limited to, the following:
- 2.1.3.2.3.1 Preparation, presentation and correction of the description of the composition of the insulator layer;
 - 2.1.3.2.3.2 Mobilization of labour, tools and equipment required for the execution of work;
 - 2.1.3.2.3.3 Supply, handling, transportation, installation, maintenance during work, removal and disposal of the insulator layers at the end of work;
 - 2.1.3.2.3.4 Costs related to the protection of concrete by insulator for the correction of defective work are to be paid by the Contractor;
 - 2.1.3.2.3.5 Any incidental expenses.
- 2.1.3.3 Item 2.1.3.3 - Heating of Concrete Components

- 2.1.3.3.1 Payment item 2.1.3.3 of the *Bid Form* is priced per cubic meter (m³) of concrete or cement slurry installed, the components of which are heated in accordance with the requirements of the drawings and specifications.
- 2.1.3.3.2 This item is used for all concrete activities if required.
- 2.1.3.3.3 Price includes, but is not limited to, the following:
 - 2.1.3.3.3.1 Heating of the mixing water (between 40 ° C and 80 ° C) used for the manufacture of the concrete;
 - 2.1.3.3.3.2 Heating of aggregates to remove frozen pieces, snow, and ice;
 - 2.1.3.3.3.3 The cost of heating the concrete or grout components without the need for shrinkage because of the correction of defective work shall be borne by the Contractor;
 - 2.1.3.3.3.4 Any incidental expenses.

2.2 STRUCTURAL WORK FOR THE REHABILITATION OF SPILLWAY 1

2.2.1 Item 2.2.1 Reconstruction of the bottom and head wall.

2.2.1.1 Item 2.2.1.1 Demolition.

- 2.2.1.1.1 Payment item 2.2.1.1 of the *Bid Form* is a price per cubic metre (m³) of demolished concrete, in accordance with the requirements of the drawings and specifications and drawings.
- 2.2.1.1.2 The price includes, but is not limited to, the following:
 - 2.2.1.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the bottom and head wall;
 - 2.2.1.1.2.2 The mobilization of labour, tools, and equipment required to carry out the work;
 - 2.2.1.1.2.3 The demolition of defective and sound concrete as well as saw cuts as directed by the Parks Canada Representative;
 - 2.2.1.1.2.4 Cleaning of reinforcing steel if present;
 - 2.2.1.1.2.5 Cleaning, surface preparation and disposition of debris;
 - 2.2.1.1.2.6 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;
 - 2.2.1.1.2.7 Any incidental expenses and coordination.

2.2.1.2 Item 2.2.1.2 Borrowing materials, MG-20

- 2.2.1.2.1 Payment item 2.2.1.2 of the *Bid Form* is priced per tons of the granular materials in accordance with the requirements of the drawings and specifications
- 2.2.1.2.2 This item is related to materials that replace excavated materials. No reuse of materials is expected for the reconstruction of the bottom and head wall on this Contract
- 2.2.1.2.3 Price includes, but is not limited to, the following:
 - 2.2.1.2.3.1 Transportation of granular materials to the site;

- 2.2.1.2.3.2 The supply and installation of borrow materials in accordance with the drawings, specifications, and instructions of the Parks Canada Representative;
- 2.2.1.2.3.3 Compaction, tests and register;
- 2.2.1.2.3.4 Cleaning of premises;
- 2.2.1.2.3.5 Any incidental expenses and coordination.

2.2.1.3 Item 2.2.1.3 Cast-in-place Concrete.

- 2.2.1.3.1 Payment item 2.2.1.3 of the *Bid Form* is a price per cubic metre (m³) of wall concrete, the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.
- 2.2.1.3.2 These prices include, but are not limited to, the following:
 - 2.2.1.3.2.1 The preparation, presentation, and correction, if required, of shop drawings, the concreting procedure, the descriptions of the mixtures and the technical data sheets required;
 - 2.2.1.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.1.3.2.3 Supply, installation and dismantling of formwork;
 - 2.2.1.3.2.4 The supply and application of mold release agent;
 - 2.2.1.3.2.5 Supply, installation, vibration, finishing, wet curing of concrete;
 - 2.2.1.3.2.6 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 2.2.1.3.2.7 Concrete finishing, tests and register;
 - 2.2.1.3.2.8 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 2.2.1.3.2.9 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 2.2.1.3.2.10 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 2.2.1.3.2.11 Any incidental expenses and coordination.

2.2.1.4 Item 2.2.1.4 Galvanized wire mesh 102X102-MW18.7

- 2.2.1.4.1 Payment item 2.2.1.4 of the *Bid Form* is a price per square metre (m²) of galvanized wire mesh 102X102-MW18.7, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications
- 2.2.1.4.2 These prices include, but are not limited to, the following :
 - 2.2.1.4.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of galvanized wire mesh;
 - 2.2.1.4.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.1.4.2.3 The supply of wire mesh and the shaping thereof;

- 2.2.1.4.2.4 Galvanizing when stipulated in plans and specifications;
- 2.2.1.4.2.5 Field cuts and adjustments;
- 2.2.1.4.2.6 The laying of galvanised wire mesh required;
- 2.2.1.4.2.7 The rebar installation confirmation table and a revision of the installation slip;
- 2.2.1.4.2.8 Any incidental expenses and coordination.

2.2.1.5 Item 2.2.1.5 Reinforcing Galvanized Steel

- 2.2.1.5.1 Payment item 2.2.1.5 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
- 2.2.1.5.2 These prices include, but are not limited to, the following:
 - 2.2.1.5.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 2.2.1.5.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.1.5.2.3 The supply of reinforcing bars and the shaping thereof;
 - 2.2.1.5.2.4 Galvanizing when stipulated in plans and specifications;
 - 2.2.1.5.2.5 Field cuts and adjustments;
 - 2.2.1.5.2.6 The laying of reinforcing steel required;
 - 2.2.1.5.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 2.2.1.5.2.8 Any incidental expenses and coordination.

2.2.1.6 Item 2.2.1.6 Chemical anchorage (galvanized steel)

- 2.2.1.6.1 Payment item 2.2.1.6 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
- 2.2.1.6.2 Price includes, but is not limited to, the following :
 - 2.2.1.6.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 2.2.1.6.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.1.6.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
 - 2.2.1.6.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
 - 2.2.1.6.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
 - 2.2.1.6.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
 - 2.2.1.6.2.7 Any incidental expenses and coordination.

2.2.1.7 Item 2.2.1.7 Formwork in contact with cast concrete.

2.2.1.7.1 Payment item 2.2.1.7 of the Bid Form is priced per square meter (m²) of surface coming into contact with the concrete to be poured in accordance with the requirements of the drawings and specifications.

2.2.1.7.2 Price includes, but is not limited to, the following:

2.2.1.7.2.1 The preparation, presentation, and correction of the Work Plan, the shop drawings, the concrete forming procedure and the technical data sheets required. The preparation, presentation and correction of the section and typical profile of formwork for approval;

2.2.1.7.2.2 The supply, installation and uninstallation of formwork and anchors;

2.2.1.7.2.3 The supply and installation of chamfers for corners;

2.2.1.7.2.4 The supply and application of release agent;

2.2.1.7.2.5 The supply and application of repair mortar for formwork cones;

2.2.1.7.2.6 The supply, transport, handling and setting of steel elements integrated into the concrete as shown in the drawings.

2.2.1.8 Item 2.2.1.8 Borrowing materials, CG-14

2.2.1.8.1 Payment item 2.2.1.8 of the *Bid Form* is priced per tons of the granular materials in accordance with the requirements of the drawings and specifications

2.2.1.8.2 This is related to materials which replace materials excavated around corrugated sheet pipes for the reconstruction of the head wall. No reuse of materials is expected for the reconstruction on this Contract

2.2.1.8.3 Price includes, but is not limited to, the following:

2.2.1.8.3.1 Transportation of granular materials to the site;

2.2.1.8.3.2 The supply and installation of borrow materials in accordance with the drawings, specifications, and instructions of the Parks Canada Representative;

2.2.1.8.3.3 Compaction, tests and register;

2.2.1.8.3.4 Cleaning of premises;

2.2.1.8.3.5 Any incidental expenses and coordination.

2.2.2 Item 2.2.2 Replace the debris grid

2.2.2.1.1 Payment item 2.2.2 of the *Bid Form* is priced per unit of debris grid, in accordance with the requirements of the drawings and specifications

2.2.2.2 Price includes, but is not limited to, the following:

2.2.2.2.1 Mobilization of labor, tools and equipment required for the execution of the work;

2.2.2.2.2 Cleaning, surface preparation and removal of the old debris grid;

2.2.2.2.3 The removal of the old debris grid, disposal off site and treatment as prescribed in section 01 74 19 - Waste Management and Disposal;

- 2.2.2.2.4 The supply, handling, transport and installation of the new debris grid;
- 2.2.2.2.5 Any incidental expenses and coordination.

2.2.3 Item 2.2.3 Repair type 2

2.2.3.1 Item 2.2.3.1 Concrete demolition

- 2.2.3.1.1 Payment item 2.2.3.1 of the *Bid Form* is a price per square metre (m²) of demolished concrete, in accordance with the requirements of the drawings and specifications and drawings.
- 2.2.3.1.2 The price includes, but is not limited to, the following:
 - 2.2.3.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;
 - 2.2.3.1.2.2 The preparation, presentation and correction of the cut and typical demolition profile of the existing concrete for approval;
 - 2.2.3.1.2.3 The mobilization of labour, tools, and equipment required to carry out the work;
 - 2.2.3.1.2.4 The demolition of defective and sound concrete as directed by the Parks Canada Representative;
 - 2.2.3.1.2.5 Cleaning, surface preparation and disposition of debris;
 - 2.2.3.1.2.6 Cleaning of reinforcing steel to be retained if present;
 - 2.2.3.1.2.7 Cleaning the concrete substrate;
 - 2.2.3.1.2.8 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;
 - 2.2.3.1.2.9 Any incidental expenses and coordination.

2.2.3.2 Item 2.2.3.2 Reinforcing Galvanized Steel

- 2.2.3.2.1 Payment item 2.2.3.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
- 2.2.3.2.2 These prices include, but are not limited to, the following:
 - 2.2.3.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 2.2.3.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.3.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 2.2.3.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 2.2.3.2.2.5 Field cuts and adjustments;
 - 2.2.3.2.2.6 The laying of reinforcing steel required;
 - 2.2.3.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 2.2.3.2.2.8 Any incidental expenses and coordination.

2.2.3.3 Item 2.2.3.3 Chemical anchorage (galvanized steel)

- 2.2.3.3.1 Payment item 2.2.3.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
- 2.2.3.3.2 Price includes, but is not limited to, the following :
- 2.2.3.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
- 2.2.3.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
- 2.2.3.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
- 2.2.3.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
- 2.2.3.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
- 2.2.3.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
- 2.2.3.3.2.7 Any incidental expenses and coordination.

2.2.3.4 Item 2.2.3.4 Formwork in contact with cast concrete.

- 2.2.3.4.1 Payment item 2.2.3.4 of the *Bid Form* is priced per square meter (m²) of surface coming into contact with the concrete to be poured in accordance with the requirements of the drawings and specifications.
- 2.2.3.4.2 Price includes, but is not limited to, the following:
- 2.2.3.4.2.1 The preparation, presentation, and correction of the Work Plan, the shop drawings, the concrete forming procedure and the technical data sheets required. The preparation, presentation and correction of the section and typical profile of formwork for approval;
- 2.2.3.4.2.2 The supply, installation and uninstallation of formwork and anchors;
- 2.2.3.4.2.3 The supply and installation of chamfers for corners;
- 2.2.3.4.2.4 The supply and application of release agent;
- 2.2.3.4.2.5 The supply and application of repair mortar for formwork cones;
- 2.2.3.4.2.6 The supply, transport, handling and setting of steel elements integrated into the concrete as shown in the drawings.

2.2.3.5 Item 2.2.3.5 Cast-in-place Concrete.

- 2.2.3.5.1 Payment item 2.2.3.5 of the *Bid Form* is a price per cubic metre (m³) of wall concrete, the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.
- 2.2.3.5.2 These prices include, but are not limited to, the following:

- 2.2.3.5.2.1 The preparation, presentation, and correction, if required, of shop drawings, the concreting procedure, the descriptions of the mixtures and the technical data sheets required;
- 2.2.3.5.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
- 2.2.3.5.2.3 Supply, installation, vibration, finishing, wet curing of concrete;
- 2.2.3.5.2.4 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
- 2.2.3.5.2.5 Concrete finishing, tests and register;
- 2.2.3.5.2.6 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
- 2.2.3.5.2.7 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
- 2.2.3.5.2.8 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
- 2.2.3.5.2.9 Any incidental expenses and coordination.

2.2.4 Item 2.2.4 Repair type 1

2.2.4.1 Item 2.2.4.1 Répair type 1 with formwork

- 2.2.4.1.1 Payment item 2.2.4.1 of the Bid Form is priced per square meter (m²) of surface repair type 1 with formworks in accordance with the requirements of the drawings and specifications.
- 2.2.4.1.2 These prices include, but are not limited to, the following:
 - 2.2.4.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;
 - 2.2.4.1.2.2 The mobilization of labour, tools, and equipment required to carry out the work;
 - 2.2.4.1.2.3 The demolition of defective and sound concrete as directed by the Parks Canada Representative;
 - 2.2.4.1.2.4 Cleaning, surface preparation and disposition of debris;
 - 2.2.4.1.2.5 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;
 - 2.2.4.1.2.6 The supply, installation and uninstallation of formwork;
 - 2.2.4.1.2.7 The supply and application of release agent;
 - 2.2.4.1.2.8 Supply, installation, vibration, finishing, wet curing of concrete;
 - 2.2.4.1.2.9 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 2.2.4.1.2.10 Concrete finishing, tests and register;
 - 2.2.4.1.2.11 At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;

- 2.2.4.1.2.12 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 2.2.4.1.2.13 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 2.2.4.1.2.14 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 2.2.4.1.2.15 Any incidental expenses and coordination.
- 2.2.4.2 Item 2.2.4.2 Reinforcing Galvanized Steel
- 2.2.4.2.1 Payment item 2.2.4.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
 - 2.2.4.2.2 These prices include, but are not limited to, the following:
 - 2.2.4.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 2.2.4.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.4.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 2.2.4.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 2.2.4.2.2.5 Field cuts and adjustments;
 - 2.2.4.2.2.6 The laying of reinforcing steel required;
 - 2.2.4.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 2.2.4.2.2.8 Any incidental expenses and coordination.
- 2.2.4.3 Item 2.2.4.3 Chemical anchorage (galvanized steel)
- 2.2.4.3.1 Payment item 2.2.4.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
 - 2.2.4.3.2 Price includes, but is not limited to, the following :
 - 2.2.4.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 2.2.4.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.4.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
 - 2.2.4.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
 - 2.2.4.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
 - 2.2.4.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
 - 2.2.4.3.2.7 Any incidental expenses and coordination.
- 2.2.5 Item 2.2.5 Replace the planks.

- 2.2.5.1 Payment item 2.2.5 of the *Bid Form* is priced per unit of plank, in accordance with the requirements of the drawings and specifications.
- 2.2.5.2 Price includes, but is not limited to, the following:
 - 2.2.5.2.1 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.5.2.2 Cleaning, surface preparation and old planks off-site disposal;
 - 2.2.5.2.2.1 The supply, handling, transport and installation of the planks;
 - 2.2.5.2.3 Any incidental expenses and coordination.

2.2.6 Item 2.2.6 Excavations and stockpiling

- 2.2.6.1 Payment item 3.2.6of the *Bid Form* is priced per cubic metre (m³) for excavated and stockpiled backfilled material. The volume shall be calculated in accordance with the section and profile of excavation accepted by the Parks Canada Representative and the Contractor excavation survey in accordance with the requirements of the drawings and specifications.
- 2.2.6.2 These prices include, but are not limited to, the following:
 - 2.2.6.2.1 The request to Info Excavation made by the Contractor prior to commencing the work and the maintenance of underground facilities indicated in Info Excavation;
 - 2.2.6.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 2.2.6.2.3 The preparation, presentation, and correction of the sections and typical soil excavation profile for acceptance, the excavation, stockpiling and disposition procedure, and the shop drawing required for the job execution;
 - 2.2.6.2.4 The georeferenced excavation survey of the existing in accordance with the approved section and profile and transmission to the Parks Canda Representative;
 - 2.2.6.2.5 Complete removal and disposition of stumps and roots in excavation areas (includes removal and off-site disposal of all stumps in this area);
 - 2.2.6.2.6 The identified excavation required for not damaging the existing dressed stones;
 - 2.2.6.2.7 Design, mobilization, supply and installation of retaining systems ir required in the chosen method;
 - 2.2.6.2.8 Drying and drainage of the excavation bottom;
 - 2.2.6.2.9 Excavation, loading, transport and stockpiling of the backfilled material (be sure to implement environmental requirements for soil storage and required protection system.);
 - 2.2.6.2.10 Compaction of bottom material before installation of any new backfill;
 - 2.2.6.2.11 Any type of excavation required to complete the work;
 - 2.2.6.2.12 Any incidental expenses and coordination.

2.2.7 Item 2.2.7 Replace the guardrails

- 2.2.7.1.1 Payment item 2.2.7 of the *Bid Form* is a price per meter (m) of installed guardrail , in accordance with the requirements of the drawings and specifications.
- 2.2.7.2 These prices include, but are not limited to, the following:

- 2.2.7.2.1 Mobilization of labor, tools and equipment required for the execution of the work;
- 2.2.7.2.2 Cleaning, surface preparation, removal of old guardrails;
- 2.2.7.2.3 The supply, handling, transport and installation of the anchors and new black-painted galvanized in accordance with the requirements of section 09 91 00.08 -Painting - small works ;
- 2.2.7.2.4 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
- 2.2.7.2.5 Any incidental expenses and coordination.

2.3 FINAL REPAIR WORK FOLLOWING THE THAW

2.3.1 Item 2.3.1 – Topsoil

- 2.3.1.1 Payment item 1.3.1 of the *Bid Form* is priced per square metre (m²), based on the area covered in accordance with the requirements of the drawings and specifications.
- 2.3.1.2 Price includes, but is not limited to, the following:
 - 2.3.1.2.1 The preparation of the ground for the placement of the topsoil;
 - 2.3.1.2.2 The supply of the material, loading, transport, spreading, leveling, stripping, removal of woody debris and waste, and any amendments necessary to make the material in accordance with drawings and specifications;
 - 2.3.1.2.3 The area payable to the Contractor shall be the area measured in place, once the work has been completed. Any excess over the lines defined by the Parks Canada Representative at the work site shall be at the Contractor's expense;
 - 2.3.1.2.4 Any incidental expenses and coordination.

2.3.2 Item 1.3.2 – Sodding with Turf Grass

- 2.3.2.1 Payment item 1.3.2 of the *Bid Form* is priced per square metre (m²) for sodding with turf grass, in accordance with the requirements of the drawings and specifications.
- 2.3.2.2 Measure sodding with turf grass per square metre of sodded area.
- 2.3.2.3 Price includes, but is not limited to, the following:
 - 2.3.2.3.1 The supply, implementation of materials in accordance with the plans and directives of the Parks Canada Representative;
 - 2.3.2.3.2 Recovery of sodding of portions of covered surfaces by less than 75% shoot height 150 mm;
 - 2.3.2.3.3 Protection and maintenance of turf;
 - 2.3.2.3.4 Cleaning of premises;
 - 2.3.2.3.5 First lawn mowing;
 - 2.3.2.3.6 Costs related to all other areas damaged by the work are considered miscellaneous and are included in the price of the restoration of the site.
 - 2.3.2.3.7 Any incidental expense and coordination.
- 2.3.2.4 The submitted price is paid as shown below:

- 2.3.2.4.1 75% of the price after initial sodding to the satisfaction of the Parks Canada Representative;
- 2.3.2.4.2 25% of the price after the first lawn mowing to the satisfaction of the Parks Canada Representative.

3 Spillway 2

3.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

- 3.1.1 Item 3.1.1 General expenses, mobilization, demobilization, traffic management, taking vidéos of the inventory and signaling
 - 3.1.1.1 This item includes mobilization and demobilization of personnel and equipment to and from the site, implementation of all health/safety requirements, application for permits, payment of permit fees, arrangements and coordination with the City of Chambly for work in the municipal right-of-way, all board, lodging and subsistence expenses, installation and maintenance of site trailer, chemical toilets, fences, supply and installation of new chain link fence or opening in the existing fence for temporary site access (if required which will have to be closed at the end of the work), including concrete, posts, bars, fasteners and grating. This item also includes installation and maintenance of temporary signage in accordance with MTQ standards, including temporary signage, coordination with authorities, surveying and staking out of structures, and survey expenses not included in other items of the Bid Form, site security services (if necessary), supply and installation of vibration control measures during the work according to CCDG of MTQ, protection of existing public utilities in the work zones and all other items required in the Bid Documents.
 - 3.1.1.2 This item also includes the supply and installation of materials for the construction of temporary cofferdams in watercourses (ditches and canal) in the required places including those shown on the plans.
 - 3.1.1.3 The lump-sum bid price for the work under this item is payable on the following terms:
 - 3.1.1.3.1 An initial payment of 30% of the lump-sum bid price for this item is payable once general mobilization is complete;
 - 3.1.1.3.2 A second payment of 50% of the lump-sum bid price for this item is payable on a prorated basis according to the work estimate;
 - 3.1.1.3.3 The balance of the lump-sum bid price for this item is payable once general demobilization is complete.
 - 3.1.2 Environmental procedures
 - 3.1.2.1 The price in payment item 2.1.2 of the Bid Form is a lump-sum amount for all expenses incurred by the Contractor for environmental protection, in accordance with the instructions in this contract.
 - 3.1.2.2 The price includes but is not limited to the following:

- 3.1.2.2.1 Everything described in Section 01 35 43, Environmental Procedures, including preparation, presentation and implementation of the environmental protection plan; preparation, presentation and implementation of the spill control plan; preparation, presentation and implementation of the location plan for the various site facilities; preparation, presentation and implementation of the work zone plans; preparation, presentation and implementation of the air pollution control plan; preparation, presentation and implementation of the contamination prevention plan; preparation, presentation and implementation of the wastewater management plan; preparation, presentation and implementation of the wetlands and historical, archeological, cultural and biological resources identification and protection plan; measures to protect the existing tree and plants; temporary facilities to prevent pollution; preparation, presentation and implementation of a site historical and heritage value protection plan.
- 3.1.2.3 The lump-sum bid price for this payment item is payable on the following terms:
- 3.1.2.3.1 An initial payment of 20% of the lump-sum bid price for this item is payable once implementation of the protection plans is complete;
- 3.1.2.3.2 The other progress payments under this item will be charged on each invoice at a percentage in line with the general progress of work on that invoice.
- 3.1.3 Item 3.1.3 Winter conditions
- 3.1.3.1 Item 3.1.3.1 - Temporary Shelter for Concrete
- 3.1.3.1.1 Payment item 3.1.3.1 of the *Bid Form* is priced per linear meter (Lin. m.) to offset all costs incurred for the temporary shelter of pre-concrete and concrete work for different types of repair and reconstruction, in accordance with the requirements of the plans and specifications.
- 3.1.3.1.2 Temporary shelter is payable only if it is required in writing by the Parks Canada Representative.
- 3.1.3.1.3 Price includes, but is not limited to, the following:
- 3.1.3.1.3.1 The preparation, presentation, and correction of the shop drawings and the description of the shelter.
- 3.1.3.1.3.2 Mobilization of labor, tools and equipment required for the execution of the work;
- 3.1.3.1.3.3 The supply, handling and transportation of the materials required to construct the shelter;
- 3.1.3.1.3.4 Installation, maintenance during construction and dismantling at the end of the temporary shelter;
- 3.1.3.1.3.5 Heating of the temporary shelter during the work;
- 3.1.3.1.3.6 Off-site transportation of materials;
- 3.1.3.1.3.7 Any incidental expenses.
- 3.1.3.1.4 The bid price is paid as follows:
- 3.1.3.1.4.1 60% of the amount after assembly of the shelter to the satisfaction of the Parks Canada Representative.

- 3.1.3.1.4.2 40% of the amount after the evacuation of the materials that made up the shelter, outside the construction site.
- 3.1.3.1.5 The price includes the equivalent of the intervention length regardless of the number of installations and relocations required. Only the equivalent of the intervention length will be paid. If the contractor places two shelters at two different heights on the same 1 m repair section, a single 1m shelter will be paid and not 2 m.
- 3.1.3.2 Item 3.1.3.2 – Insulator (RSI 0.40 per layer)
- 3.1.3.2.1 Payment item 3.1.3.2 of the *Bid Form* is priced per square meter (m²) of new concrete without formwork covered by an insulator, in accordance with the requirements of the drawings and specifications.
- 3.1.3.2.2 Insulator layers are paid only if required, in writing, by the Parks Canada Representative;
- 3.1.3.2.3 Price includes, but is not limited to, the following:
- 3.1.3.2.3.1 Preparation, presentation and correction of the description of the composition of the insulator layer;
 - 3.1.3.2.3.2 Mobilization of labour, tools and equipment required for the execution of work;
 - 3.1.3.2.3.3 Supply, handling, transportation, installation, maintenance during work, removal and disposal of the insulator layers at the end of work;
 - 3.1.3.2.3.4 Costs related to the protection of concrete by insulator for the correction of defective work are to be paid by the Contractor;
 - 3.1.3.2.3.5 Any incidental expenses.
- 3.1.3.3 Item 3.1.3.3 - Heating of Concrete Components
- 3.1.3.3.1 Payment item 3.1.3.3 of the *Bid Form* is priced per cubic meter (m³) of concrete or cement slurry installed, the components of which are heated in accordance with the requirements of the drawings and specifications.
- 3.1.3.3.2 This item is used for all concrete activities if required.
- 3.1.3.3.3 Price includes, but is not limited to, the following:
- 3.1.3.3.3.1 Heating of the mixing water (between 40 ° C and 80 ° C) used for the manufacture of the concrete;
 - 3.1.3.3.3.2 Heating of aggregates to remove frozen pieces, snow, and ice;
 - 3.1.3.3.3.3 The cost of heating the concrete or grout components without the need for shrinkage because of the correction of defective work shall be borne by the Contractor;
 - 3.1.3.3.3.4 Any incidental expenses.

3.2 STRUCTURAL WORKS FOR THE REHABILITATION OF SPILLWAY 2

3.2.1 Item 3.2.1 Replace planks.

- 3.2.1.1 Payment item 3.2.1 of the *Bid Form* is priced per unit of plank, in accordance with the requirements of the drawings and specification

3.2.1.2 Price includes, but is not limited to, the following:

3.2.1.2.1 Mobilization of labor, tools and equipment required for the execution of the work;

3.2.1.2.2 Cleaning, surface preparation and old planks off-site disposal;

3.2.1.2.2.1 The supply, handling, transport and installation of the planks;

3.2.1.2.3 Any incidental expenses and coordination.

3.2.2 Item 3.2.2 Repair type 2

3.2.2.1 Item 3.2.2.1 Concrete demolition

3.2.2.1.1 Payment item 3.2.2.1 of the *Bid Form* is a price per square metre (m²) of demolished concrete, in accordance with the requirements of the drawings and specifications and drawings.

3.2.2.1.2 The price includes, but is not limited to, the following:

3.2.2.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;

3.2.2.1.2.2 The preparation, presentation and correction of the cut and typical demolition profile of the existing concrete for approval;

3.2.2.1.2.3 The mobilization of labour, tools, and equipment required to carry out the work;

3.2.2.1.2.4 The demolition of defective and sound concrete as directed by the Parks Canada Representative;

3.2.2.1.2.5 Cleaning, surface preparation and disposition of debris;

3.2.2.1.2.6 Cleaning of reinforcing steel to be retained if present;

3.2.2.1.2.7 Cleaning the concrete substrate;

3.2.2.1.2.8 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;

3.2.2.1.2.9 Any incidental expenses and coordination.

3.2.2.2 Item 3.2.2.2 Reinforcing Galvanized Steel

3.2.2.2.1 Payment item 3.2.2.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.

3.2.2.2.2 These prices include, but are not limited to, the following:

3.2.2.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;

3.2.2.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;

3.2.2.2.2.3 The supply of reinforcing bars and the shaping thereof;

3.2.2.2.2.4 Galvanizing when stipulated in plans and specifications;

3.2.2.2.2.5 Field cuts and adjustments;

3.2.2.2.2.6 The laying of reinforcing steel required;

- 3.2.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
- 3.2.2.2.8 Any incidental expenses and coordination.
- 3.2.2.3 Item 3.2.2.3 Chemical anchorage (galvanized steel)
 - 3.2.2.3.1 Payment item 3.2.2.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
 - 3.2.2.3.2 Price includes, but is not limited to, the following :
 - 3.2.2.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 3.2.2.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.2.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
 - 3.2.2.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
 - 3.2.2.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
 - 3.2.2.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
 - 3.2.2.3.2.7 Any incidental expenses and coordination.
- 3.2.2.4 Item 3.2.2.4 Formwork in contact with cast concrete.
 - 3.2.2.4.1 Payment item 3.2.2.4 of the *Bid Form* is priced per square meter (m²) of surface coming into contact with the concrete to be poured in accordance with the requirements of the drawings and specifications.
 - 3.2.2.4.2 Price includes, but is not limited to, the following:
 - 3.2.2.4.2.1 The preparation, presentation, and correction of the Work Plan, the shop drawings, the concrete forming procedure and the technical data sheets required. The preparation, presentation and correction of the section and typical profile of formwork for approval;
 - 3.2.2.4.2.2 The supply, installation and uninstallation of formwork and anchors;
 - 3.2.2.4.2.3 The supply and installation of chamfers for corners;
 - 3.2.2.4.2.4 The supply and application of release agent;
 - 3.2.2.4.2.5 The supply and application of repair mortar for formwork cones;
 - 3.2.2.4.2.6 The supply, transport, handling and setting of steel elements integrated into the concrete as shown in the drawings.
- 3.2.2.5 Item 3.2.2.5 Cast-in-place Concrete.

- 3.2.2.5.1 Payment item 3.2.2.5 of the *Bid Form* is a price per cubic metre (m³) of wall concrete, the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.
- 3.2.2.5.2 These prices include, but are not limited to, the following:
- 3.2.2.5.2.1 The preparation, presentation, and correction, if required, of shop drawings, the concreting procedure, the descriptions of the mixtures and the technical data sheets required;
 - 3.2.2.5.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.2.5.2.3 Supply, installation, vibration, finishing, wet curing of concrete;
 - 3.2.2.5.2.4 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 3.2.2.5.2.5 Concrete finishing, tests and register;
 - 3.2.2.5.2.6 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 3.2.2.5.2.7 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 3.2.2.5.2.8 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 3.2.2.5.2.9 Any incidental expenses and coordination.
- 3.2.3 Item 3.2.3 Repair type 1
- 3.2.3.1 Item 3.2.3.1 Repair type 1 with formwork
- 3.2.3.1.1 Payment item 3.2.3.1 of the Bid Form is priced per square meter (m²) of surface repair type 1 with formworks in accordance with the requirements of the drawings and specifications.
- 3.2.3.1.2 These prices include, but are not limited to, the following:
- 3.2.3.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;
 - 3.2.3.1.2.2 The mobilization of labour, tools, and equipment required to carry out the work;
 - 3.2.3.1.2.3 The demolition of defective and sound concrete as directed by the Parks Canada Representative;
 - 3.2.3.1.2.4 Cleaning, surface preparation and disposition of debris;
 - 3.2.3.1.2.5 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;
 - 3.2.3.1.2.6 The supply, installation and uninstallation of formwork;
 - 3.2.3.1.2.7 The supply and application of release agent;
 - 3.2.3.1.2.8 Supply, installation, vibration, finishing, wet curing of concrete;
 - 3.2.3.1.2.9 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;

- 3.2.3.1.2.10 Concrete finishing, tests and register;
 - 3.2.3.1.2.11 At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 3.2.3.1.2.12 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 3.2.3.1.2.13 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 3.2.3.1.2.14 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 3.2.3.1.2.15 Any incidental expenses and coordination.
- 3.2.3.2 Item 3.2.3.2 Reinforcing Galvanized Steel
- 3.2.3.2.1 Payment item 3.2.3.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
 - 3.2.3.2.2 These prices include, but are not limited to, the following:
 - 3.2.3.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 3.2.3.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.3.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 3.2.3.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 3.2.3.2.2.5 Field cuts and adjustments;
 - 3.2.3.2.2.6 The laying of reinforcing steel required;
 - 3.2.3.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 3.2.3.2.2.8 Any incidental expenses and coordination.
- 3.2.3.3 Item 3.2.3.3 Chemical anchorage (galvanized steel)
- 3.2.3.3.1 Payment item 3.2.3.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
 - 3.2.3.3.2 Price includes, but is not limited to, the following :
 - 3.2.3.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 3.2.3.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.3.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
 - 3.2.3.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
 - 3.2.3.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;

3.2.3.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;

3.2.3.3.2.7 Any incidental expenses and coordination.

3.2.4 Item 3.2.4 Crack repair

3.2.4.1 Item 3.2.4.1 Concrete demolition

3.2.4.1.1 Payment item 3.2.4.1 of the *Bid Form* is a price per square metre (m²) of demolished concrete, in accordance with the requirements of the drawings and specifications and drawings.

3.2.4.1.2 The price includes, but is not limited to, the following:

3.2.4.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;

3.2.4.1.2.2 The preparation, presentation and correction of the cut and typical demolition profile of the existing concrete for approval;

3.2.4.1.2.3 The mobilization of labour, tools, and equipment required to carry out the work;

3.2.4.1.2.4 The demolition of defective and sound concrete as directed by the Parks Canada Representative;

3.2.4.1.2.5 Cleaning, surface preparation and disposition of debris;

3.2.4.1.2.6 Cleaning of reinforcing steel to be retained if present;

3.2.4.1.2.7 Cleaning the concrete substrate;

3.2.4.1.2.8 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;

3.2.4.1.2.9 Any incidental expenses and coordination.

3.2.4.2 Item 3.2.4.2 Reinforcing Galvanized Steel

3.2.4.2.1 Payment item 3.2.4.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.

3.2.4.2.2 These prices include, but are not limited to, the following:

3.2.4.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;

3.2.4.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;

3.2.4.2.2.3 The supply of reinforcing bars and the shaping thereof;

3.2.4.2.2.4 Galvanizing when stipulated in plans and specifications;

3.2.4.2.2.5 Field cuts and adjustments;

3.2.4.2.2.6 The laying of reinforcing steel required;

3.2.4.2.2.7 The rebar installation confirmation table and a revision of the installation slip;

3.2.4.2.2.8 Any incidental expenses and coordination.

3.2.4.3 Item 3.2.4.3 Chemical anchorage (galvanized steel)

- 3.2.4.3.1 Payment item 3.2.4.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
- 3.2.4.3.2 Price includes, but is not limited to, the following :
- 3.2.4.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
- 3.2.4.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
- 3.2.4.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
- 3.2.4.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
- 3.2.4.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
- 3.2.4.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
- 3.2.4.3.2.7 Any incidental expenses and coordination.

3.2.4.4 Item 3.2.4.4 Formwork in contact with cast concrete.

- 3.2.4.4.1 Payment item 3.2.4.4 of the *Bid Form* is priced per square meter (m²) of surface coming into contact with the concrete to be poured in accordance with the requirements of the drawings and specifications.
- 3.2.4.4.2 Price includes, but is not limited to, the following:
- 3.2.4.4.2.1 The preparation, presentation, and correction of the Work Plan, the shop drawings, the concrete forming procedure and the technical data sheets required. The preparation, presentation and correction of the section and typical profile of formwork for approval;
- 3.2.4.4.2.2 The supply, installation and uninstallation of formwork and anchors;
- 3.2.4.4.2.3 The supply and installation of chamfers for corners;
- 3.2.4.4.2.4 The supply and application of release agent;
- 3.2.4.4.2.5 The supply and application of repair mortar for formwork cones;
- 3.2.4.4.2.6 The supply, transport, handling and setting of steel elements integrated into the concrete as shown in the drawings.

3.2.4.5 Item 3.2.4.5 Cast-in-place Concrete.

- 3.2.4.5.1 Payment item 3.2.4.5 of the *Bid Form* is a price per cubic metre (m³) of wall concrete, the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.
- 3.2.4.5.2 These prices include, but are not limited to, the following:

- 3.2.4.5.2.1 The preparation, presentation, and correction, if required, of shop drawings, the concreting procedure, the descriptions of the mixtures and the technical data sheets required;
 - 3.2.4.5.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.4.5.2.3 Supply, installation, vibration, finishing, wet curing of concrete;
 - 3.2.4.5.2.4 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 3.2.4.5.2.5 Concrete finishing, tests and register;
 - 3.2.4.5.2.6 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 3.2.4.5.2.7 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 3.2.4.5.2.8 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 3.2.4.5.2.9 Any incidental expenses and coordination.
- 3.2.5 Item 3.2.5 Add the guardrails
- 3.2.5.1.1 Payment item 3.2.5 of the *Bid Form* is a price per meter (m) of installed guardrail , in accordance with the requirements of the drawings and specifications.
 - 3.2.5.2 These prices include, but are not limited to, the following:
 - 3.2.5.2.1 Mobilization of labor, tools and equipment required for the execution of the work;
 - 3.2.5.2.2 Cleaning, surface preparation, removal of old guardrails;
 - 3.2.5.2.3 The supply, handling, transport and installation of the anchors and new black-painted galvanized guardrails in accordance with the requirements of section 09 91 00.08 - Painting - small works;
 - 3.2.5.2.4 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 3.2.5.2.5 Any incidental expenses and coordination.
- 3.2.6 Item 3.2.6 Excavations and stockpiling
- 3.2.6.1 Payment item 3.2.6 of the *Bid Form* is priced per cubic metre (m³) for excavated and stockpiled backfilled material. The volume shall be calculated in accordance with the section and profile of excavation accepted by the Parks Canada Representative and the Contractor excavation survey in accordance with the requirements of the drawings and specifications.
 - 3.2.6.2 These prices include, but are not limited to, the following:
 - 3.2.6.2.1 The request to Info Excavation made by the Contractor prior to commencing the work and the maintenance of underground facilities indicated in Info Excavation;
 - 3.2.6.2.2 Mobilization of labor, tools and equipment required for the execution of the work;

- 3.2.6.2.3 The preparation, presentation, and correction of the sections and typical soil excavation profile for acceptance, the excavation, stockpiling and disposition procedure, and the shop drawing required for the job execution;
- 3.2.6.2.4 The georeferenced excavation survey of the existing in accordance with the approved section and profile and transmission to the Parks Canada Representative;
- 3.2.6.2.5 Complete removal and disposition of stumps and roots in excavation areas (includes removal and off-site disposal of all stumps in this area);
- 3.2.6.2.6 The identified excavation required for not damaging the existing dressed stones;
- 3.2.6.2.7 Design, mobilization, supply and installation of retaining systems if required in the chosen method;
- 3.2.6.2.8 Drying and drainage of the excavation bottom;
- 3.2.6.2.9 Excavation, loading, transport and stockpiling of the backfilled material (be sure to implement environmental requirements for soil storage and required protection system.);
- 3.2.6.2.10 Compaction of bottom material before installation of any new backfill;
- 3.2.6.2.11 Any type of excavation required to complete the work;
- 3.2.6.2.12 Any incidental expenses and coordination.

4 Workshop ditch

4.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

- 4.1.1 General expenses, mobilization, demobilization, traffic maintenance, taking videos of the inventory and signaling
 - 4.1.1.1 The price is a lump sum. This item includes the mobilization and demobilization of personnel and equipment on site, the implementation of all health / safety requirements, obtaining permits and permit fees, coordination and procedures at the City of Chambly for works in the municipal right-of-way, all costs for board and lodging and subsistence, installation and maintenance of the construction trailer, chemical toilets, fences, supply and the installation of a new chain link fence or an opening in the existing fence for temporary access to the site (if required), including concrete, poles, bars, fasteners, and wire fencing. This item also includes the installation and maintenance of temporary signaling according to Ministry of Transports of Quebec standards, including temporary signaling, coordination with authorities, costs of surveying, picket of works and costs of surveys that are not charged to any item of the Bid Form, site security costs (if necessary), protection of existing public utilities in the work areas as well as all the other elements required by the "Tender Documents".
 - 4.1.1.2 This item also includes the supply and installation of materials for making temporary cofferdams in water streams in the required places, including those shown on the plans.
 - 4.1.1.3 The lump sum price submitted for the work provided for in this item is payable in the following manner:

- 4.1.1.3.1 A first payment of 30% of the lump sum bid price for this item is payable when the general mobilization is completed.
- 4.1.1.3.2 A second payment of 50% of the lump sum bid price for this item is payable in proportion to the estimate of the work.
- 4.1.1.3.3 The balance of the lump sum bid for this item is payable when the general demobilization is fully completed.

4.1.2 Winter conditions

- 4.1.2.1 The price is a global lump-sum amount for all expenses incurred in installing the necessary facilities for performance of the work in cold weather, as well as costs not included in other payment items in the Bid Form, in accordance with the specifications.
- 4.1.2.2 The price includes but is not limited to the following:
 - 4.1.2.2.1 Preparation, presentation and correction, if required, of the description of facilities. Snow removal.
 - 4.1.2.2.2 Mobilization of labour, tools and equipment required for performance of the work.
 - 4.1.2.2.3 Supply, handling and transportation of materials required to build the facilities.
 - 4.1.2.2.4 Installation, maintenance during the work and dismantling of temporary facilities upon work completion.
 - 4.1.2.2.5 Heating of temporary facilities during the work.
 - 4.1.2.2.6 Transportation of materials off-site.
 - 4.1.2.2.7 Any incidental expenses.
 - 4.1.2.2.8 Winter conditions are payable only if required, in writing, by the Parks Canada Representative.
 - 4.1.2.2.9 The bid price shall be paid as follows:
 - 4.1.2.2.10 60 % of the amount after assembly of facilities to the Parks Canada Representative's satisfaction.
 - 4.1.2.2.11 40 % of the amount after removal from the site of materials used in building the facilities.

4.1.3 Removal and disposal of phragmites

- 4.1.3.1 The price is an amount per square meter of removal and disposal of phragmites and this, previously approved by the PCA Representative. This compensation constitutes full compensation for the removal and off-site disposal of phragmites in a site that complies with the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".

4.2 REHABILITATION OF THE WORKSHOP DITCH

4.2.1 Chain link fence

- 4.2.1.1 The price is a linear amount of new fence. This item constitutes full compensation for the removal, loading, transportation and disposal of existing fence sections, including the removal

of concrete bases, posts, bars, fasteners, wire mesh and l installation of the new fence including all accessories and specifications to the plans, as well as all the other elements required by the "Tender Documents".

4.2.2 Reprofilng of the workshop's ditch

4.2.2.1 The price is a linear amount of ditch to be reprofiled. This item constitutes complete compensation for ditch reprofiling, including excavation, loading, transport as well as the off-site disposal of surpluses in a site that meets the requirements of the MELCC, the supply and installation of new materials. coating, as shown on the plans, as well as all the other elements required by the "Tender Documents".

4.2.3 Cutting trees

4.2.3.1 The price is per unit of cut trees, beforehand to be approved by the PCA Representative. This compensation constitutes full compensation for the removal and off-site disposal of trees in a site that complies with the requirements of the MELCC, the backfilling of the pit, as well as all the other elements required by the "Appeal Documents offers".

4.2.4 Rock at the ends of the wall

4.2.4.1 The price is an amount per square meter of rock required. This remuneration constitutes full compensation for the supply and mechanical installation of the riprap including the geotextile, the cutting and sewing work and the overlapping of the latter, as well as all the other elements required by the "Tender Documents".

4.2.5 Excavation and disposal of materials from the bottom of the ditch

4.2.5.1 The price is an amount per cubic meter for this work. This item constitutes full compensation for the excavation work of the existing ditch as well as its widening and the filling of part of the existing ditch, soil preparation, supply and implementation of topsoil, including the spreading of fertilizer, seeding according to the method designated and approved by the representative of Parks Canada, as well as the initial maintenance work, as well as all the other elements required by the "Tender Documents".

4.2.6 Native seeding

4.2.6.1 The price is an amount per square meter for this work. This item constitutes complete compensation for the preparation of the soil, the supply and implementation of topsoil, including the spreading of fertilizer, seeding according to the method designated and approved by the Parks representative. Canada, as well as the initial maintenance work, as well as all the other elements required by the "Tender Documents".

4.2.6.2 Supply and installation of the retaining wall

4.2.6.3 The price is an amount payable per square meter of wall surface to be built. The Contractor must supply and install a block retaining wall, including the supply of a workshop plan for the nested concrete block retaining wall proposed, signed and sealed by an engineer member in good standing of the Order engineers from Quebec. The nominal lifespan of the wall and all its components must be 75 years. The contractor must consider that the installation of a drain for drainage behind the wall is permitted but that the proposed retaining wall must not include

anchors or inclusions. The contractor must consider for the design of the structure that the acceptable differential, longitudinal and transverse settlements are 1%. The structure must be made of precast concrete blocks designed to resist slipping and to maintain a uniform slope. Slip resistance can be provided by the shape of the block or by studs. The wall must be designed in accordance with the requirements of CAN / CSA S6 "Canadian code for the calculation of highway bridges". For the seismic calculation, the acceleration ratio "A" must be that of appendix A3.1 of this CSA standard. The minimum depth of the plug is 400 mm and if the ground is frost-resistant, the depth of the plug must provide protection against frost. In addition, the depth of the plug must also take into account the slope of the ground in front of the wall. Nested concrete blocks must be gray in color.

- 4.2.6.4 The price covers in particular the creation of exploration wells near the wall, the design, temporary support, supply and installation of all materials, including the foundation, foundations, drain and trench draining, geotextile, studs, excavations, styrofoam, geogrids if required, backfilling, transport, and it includes any incidental expense for a complete installation and complying with the requirements of contractual documents.

4.3 FINAL REPAIR WORK FOLLOWING THE THAW

4.3.1 Rehabilitation of topsoil surfaces and seeding

- 4.3.1.1 The price is an amount payable per square meter of damaged plant area and approved beforehand by the PCA Representative. This item constitutes complete compensation for the preparation of the soil, the supply and implementation of topsoil, including the spreading of fertilizer, seeding according to the method designated and approved by the Parks Canada representative as well as the initial maintenance work, as well as all the other elements required by the "Tender Documents".

- 4.3.1.2 The area payable to the Contractor is that measured in place, once the work has been completed. Any excess on the lines defined by Parks Canada Representative on the site is at the Contractor's cost.

5 Spillway 3

5.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

5.1.1 Item 5.1.1 General expenses, mobilization, demobilization, traffic management, taking vidéos of the inventory and signaling

- 5.1.1.1 This item includes mobilization and demobilization of personnel and equipment to and from the site, implementation of all health/safety requirements, application for permits, payment of permit fees, arrangements and coordination with the City of Chambly for work in the municipal right-of-way, all board, lodging and subsistence expenses, installation and maintenance of site trailer, chemical toilets, fences, supply and installation of new chain link fence or opening in the existing fence for temporary site access (if required and which will have to be closed at the end of the work), including concrete, posts, bars, fasteners and grating. This item also includes installation and maintenance of temporary signage in accordance with MTQ standards, including temporary signage, coordination with authorities, surveying

and staking out of structures, and survey expenses not included in other items of the Bid Form, site security services (if necessary), supply and installation of vibration control measures during the work according to CCDG of MTMDET, protection of existing public utilities in the work zones and all other items required in the Bid Documents.

5.1.1.2 This item also includes the supply and installation of materials for the construction of temporary cofferdams in watercourses (ditches and canal) in the required places including those shown on the plans.

5.1.1.3 The lump-sum bid price for the work under this item is payable on the following terms:

5.1.1.3.1 An initial payment of 30% of the lump-sum bid price for this item is payable once general mobilization is complete;

5.1.1.3.2 A second payment of 50% of the lump-sum bid price for this item is payable on a prorated basis according to the work estimate;

5.1.1.3.3 The balance of the lump-sum bid price for this item is payable once general demobilization is complete.

5.1.2 Item 5.1.2 Environmental procedures

5.1.2.1 The price in payment item 5.1.2 of the Bid Form is a lump-sum amount for all expenses incurred by the Contractor for environmental protection, in accordance with the instructions in this contract.

5.1.2.2 The price includes but is not limited to the following:

5.1.2.2.1 Everything described in Section 01 35 43, Environmental Procedures, including preparation, presentation and implementation of the environmental protection plan; preparation, presentation and implementation of the spill control plan; preparation, presentation and implementation of the location plan for the various site facilities; preparation, presentation and implementation of the work zone plans; preparation, presentation and implementation of the air pollution control plan; preparation, presentation and implementation of the contamination prevention plan; preparation, presentation and implementation of the wastewater management plan; preparation, presentation and implementation of the wetlands and historical, archeological, cultural and biological resources identification and protection plan; measures to protect the existing tree and plants; temporary facilities to prevent pollution; preparation, presentation and implementation of a site historical and heritage value protection plan.

5.1.2.3 The lump-sum bid price for this payment item is payable on the following terms:

5.1.2.3.1 An initial payment of 20% of the lump-sum bid price for this item is payable once implementation of the protection plans is complete;

5.1.2.3.2 The other progress payments under this item will be charged on each invoice at a percentage in line with the general progress of work on that invoice.

5.1.3 Item 5.1.3 Winter conditions

5.1.3.1 Item 5.1.3.1 - Temporary Shelter for Concrete

5.1.3.1.1 Payment item 5.1.3.1 of the *Bid Form* is priced per linear meter (Lin. m.) to offset all costs incurred for the temporary shelter of pre-concrete and concrete work for different types of repair and reconstruction, in accordance with the requirements of the plans and specifications.

- 5.1.3.1.2 Temporary shelter is payable only if it is required in writing by the Parks Canada Representative.
- 5.1.3.1.3 Price includes, but is not limited to, the following:
- 5.1.3.1.3.1 The preparation, presentation, and correction of the shop drawings and the description of the shelter.
 - 5.1.3.1.3.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 5.1.3.1.3.3 The supply, handling and transportation of the materials required to construct the shelter;
 - 5.1.3.1.3.4 Installation, maintenance during construction and dismantling at the end of the temporary shelter;
 - 5.1.3.1.3.5 Heating of the temporary shelter during the work;
 - 5.1.3.1.3.6 Off-site transportation of materials;
 - 5.1.3.1.3.7 Any incidental expenses.
- 5.1.3.1.4 The bid price is paid as follows:
- 5.1.3.1.4.1 60% of the amount after assembly of the shelter to the satisfaction of the Parks Canada Representative.
 - 5.1.3.1.4.2 40% of the amount after the evacuation of the materials that made up the shelter, outside the construction site.
- 5.1.3.1.5 The price includes the equivalent of the intervention length regardless of the number of installations and relocations required. Only the equivalent of the intervention length will be paid. If the contractor places two shelters at two different heights on the same 1 m repair section, a single 1m shelter will be paid and not 2 m.
- 5.1.3.2 Item 5.1.3.2 – Insulator (RSI 0.40 per layer)
- 5.1.3.2.1 Payment item 5.1.3.2 of the *Bid Form* is priced per square meter (m²) of new concrete without formwork covered by an insulator, in accordance with the requirements of the drawings and specifications.
- 5.1.3.2.2 Insulator layers are paid only if required, in writing, by the Parks Canada Representative;
- 5.1.3.2.3 Price includes, but is not limited to, the following:
- 5.1.3.2.3.1 Preparation, presentation and correction of the description of the composition of the insulator layer;
 - 5.1.3.2.3.2 Mobilization of labour, tools and equipment required for the execution of work;
 - 5.1.3.2.3.3 Supply, handling, transportation, installation, maintenance during work, removal and disposal of the insulator layers at the end of work;
 - 5.1.3.2.3.4 Costs related to the protection of concrete by insulator for the correction of defective work are to be paid by the Contractor;
 - 5.1.3.2.3.5 Any incidental expenses.

5.1.3.3 Item 5.1.3.3 - Heating of Concrete Components

5.1.3.3.1 Payment item 5.1.3.3 of the *Bid Form* is priced per cubic meter (m³) of concrete or cement slurry installed, the components of which are heated in accordance with the requirements of the drawings and specifications.

5.1.3.3.2 This item is used for all concrete activities if required.

5.1.3.3.3 Price includes, but is not limited to, the following:

5.1.3.3.3.1 Heating of the mixing water (between 40 ° C and 80 ° C) used for the manufacture of the concrete;

5.1.3.3.3.2 Heating of aggregates to remove frozen pieces, snow, and ice;

5.1.3.3.3.3 The cost of heating the concrete or grout components without the need for shrinkage because of the correction of defective work shall be borne by the Contractor;

5.1.3.3.3.4 Any incidental expenses.

5.2 STRUCTURAL WORK FOR THE REHABILITATION OF SPILLWAY 3

5.2.1 Item 5.2.1 Repair type 1

5.2.1.1 Item 5.2.1.1 Repair type 1 with formwork

5.2.1.1.1 Payment item 5.2.1.1 of the Bid Form is priced per square meter (m²) of surface repair type 1 with formworks in accordance with the requirements of the drawings and specifications.

5.2.1.1.2 These prices include, but are not limited to, the following:

5.2.1.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;

5.2.1.1.2.2 The mobilization of labour, tools, and equipment required to carry out the work;

5.2.1.1.2.3 Supporting and holding the beams in place during repairs and during the curing of the concrete, at least (7 days). The passage of vehicles or heavy machinery on the deck is prohibited during repairs carried out underneath it;

5.2.1.1.2.4 The demolition of defective and sound concrete as directed by the Parks Canada Representative;

5.2.1.1.2.5 Cleaning, surface preparation and disposition of debris;

5.2.1.1.2.6 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;

5.2.1.1.2.7 The supply, installation and uninstallation of formwork;

5.2.1.1.2.8 The supply and application of release agent;

5.2.1.1.2.9 Supply, installation, vibration, finishing, wet curing of concrete;

- 5.2.1.1.2.10 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 5.2.1.1.2.11 Concrete finishing, tests and register;
 - 5.2.1.1.2.12 At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 5.2.1.1.2.13 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 5.2.1.1.2.14 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 5.2.1.1.2.15 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 5.2.1.1.2.16 Any incidental expenses and coordination.
- 5.2.1.2 Item 5.2.1.2 Reinforcing Galvanized Steel
- 5.2.1.2.1 Payment item 5.2.1.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
 - 5.2.1.2.2 These prices include, but are not limited to, the following:
 - 5.2.1.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 5.2.1.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 5.2.1.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 5.2.1.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 5.2.1.2.2.5 Field cuts and adjustments;
 - 5.2.1.2.2.6 The laying of reinforcing steel required;
 - 5.2.1.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 5.2.1.2.2.8 Any incidental expenses and coordination.
- 5.2.1.3 Item 5.2.1.3 Chemical anchorage (galvanized steel)
- 5.2.1.3.1 Payment item 5.2.1.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
 - 5.2.1.3.2 Price includes, but is not limited to, the following :
 - 5.2.1.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 5.2.1.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 5.2.1.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;

- 5.2.1.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
- 5.2.1.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
- 5.2.1.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
- 5.2.1.3.2.7 Any incidental expenses and coordination

5.2.2 Item 5.2.2 Repair type 2

5.2.2.1 Item 5.2.2.1 Concrete demolition

5.2.2.1.1 Payment item 5.2.2.1 of the *Bid Form* is a price per square metre (m²) of demolished concrete, in accordance with the requirements of the drawings and specifications and drawings.

5.2.2.1.2 The price includes, but is not limited to, the following:

5.2.2.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;

5.2.2.1.2.2 The preparation, presentation and correction of the cut and typical demolition profile of the existing concrete for approval;

5.2.2.1.2.3 The mobilization of labour, tools, and equipment required to carry out the work;

5.2.2.1.2.4 The removal of the fence as well as its reinstatement at the end of the repair work;

5.2.2.1.2.5 The demolition of defective and sound concrete as directed by the Parks Canada Representative;

5.2.2.1.2.6 Cleaning, surface preparation and disposition of debris;

5.2.2.1.2.7 Cleaning of reinforcing steel to be retained if present;

5.2.2.1.2.8 Cleaning the concrete substrate;

5.2.2.1.2.9 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;

5.2.2.1.2.10 Any incidental expenses and coordination.

5.2.2.2 Item 5.2.2.2 Reinforcing Galvanized Steel

5.2.2.2.1 Payment item 5.2.2.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.

5.2.2.2.2 These prices include, but are not limited to, the following:

5.2.2.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;

- 5.2.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 5.2.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 5.2.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 5.2.2.2.5 Field cuts and adjustments;
 - 5.2.2.2.6 The laying of reinforcing steel required;
 - 5.2.2.2.7 The rebar installation confirmation table and a revision of the installation slip;
 - 5.2.2.2.8 Any incidental expenses and coordination.
- 5.2.2.3 Item 5.2.2.3 Chemical anchorage (galvanized steel)
- 5.2.2.3.1 Payment item 5.2.2.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications
 - 5.2.2.3.2 Price includes, but is not limited to, the following :
 - 5.2.2.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;
 - 5.2.2.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
 - 5.2.2.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;
 - 5.2.2.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;
 - 5.2.2.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;
 - 5.2.2.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;
 - 5.2.2.3.2.7 Any incidental expenses and coordination.
- 5.2.2.4 Item 5.2.2.4 Formwork in contact with cast concrete.
- 5.2.2.4.1 Payment item 5.2.2.4 of the Bid Form is priced per square meter (m²) of surface coming into contact with the concrete to be poured in accordance with the requirements of the drawings and specifications.
 - 5.2.2.4.2 Price includes, but is not limited to, the following:
 - 5.2.2.4.2.1 The preparation, presentation, and correction of the Work Plan, the shop drawings, the concrete forming procedure and the technical data sheets required. The preparation, presentation and correction of the section and typical profile of formwork for approval;
 - 5.2.2.4.2.2 The supply, installation and uninstallation of formwork and anchors;
 - 5.2.2.4.2.3 The supply and installation of chamfers for corners;

- 5.2.2.4.2.4 The supply and application of release agent;
- 5.2.2.4.2.5 The supply and application of repair mortar for formwork cones;
- 5.2.2.4.2.6 The supply, transport, handling and setting of steel elements integrated into the concrete as shown in the drawings.

5.2.2.5 Item 5.2.2.5 Cast-in-place Concrete.

5.2.2.5.1 Payment item 5.2.2.5 of the *Bid Form* is a price per cubic metre (m³) of wall concrete, the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.

5.2.2.5.2 These prices include, but are not limited to, the following:

- 5.2.2.5.2.1 The preparation, presentation, and correction, if required, of shop drawings, the concreting procedure, the descriptions of the mixtures and the technical data sheets required;
- 5.2.2.5.2.2 Mobilization of labor, tools and equipment required for the execution of the work;
- 5.2.2.5.2.3 Supply, installation, vibration, finishing, wet curing of concrete;
- 5.2.2.5.2.4 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
- 5.2.2.5.2.5 Concrete finishing, tests and register;
- 5.2.2.5.2.6 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
- 5.2.2.5.2.7 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
- 5.2.2.5.2.8 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
- 5.2.2.5.2.9 Any incidental expenses and coordination.

5.2.3 Repair type 3

5.2.3.1 Item 5.2.3.1 Repair type 3 with formwork

5.2.3.1.1 Payment item 5.2.3.1 of the *Bid Form* is priced per square meter (m²) of surface repair type 1 with formworks in accordance with the requirements of the drawings and specifications.

5.2.3.1.2 These prices include, but are not limited to, the following:

- 5.2.3.1.2.1 Preparation, presentation, and correction of the demolition procedure and the Work Plan regarding the demolition of the wall;
- 5.2.3.1.2.2 The mobilization of labour, tools, and equipment required to carry out the work;

- 5.2.3.1.2.3 Supporting and holding the beams in place during repairs and during the curing of the concrete, at least (7 days). The passage of vehicles or heavy machinery on the deck is prohibited during repairs carried out underneath it;
 - 5.2.3.1.2.4 The demolition of defective and sound concrete as directed by the Parks Canada Representative;
 - 5.2.3.1.2.5 Cleaning, surface preparation and disposition of debris;
 - 5.2.3.1.2.6 The collection and treatment of demolition materials as prescribed by Section 01 74 19 – *Waste Management and Disposal*;
 - 5.2.3.1.2.7 The supply, installation and uninstallation of formwork;
 - 5.2.3.1.2.8 The supply and application of release agent;
 - 5.2.3.1.2.9 Supply, installation, vibration, finishing, wet curing of concrete;
 - 5.2.3.1.2.10 Cleaning of concrete surfaces adjacent to the concreting area; At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 5.2.3.1.2.11 Concrete finishing, tests and register;
 - 5.2.3.1.2.12 At the end of the work, off-site evacuation of the formwork materials and correction of defective repairs;
 - 5.2.3.1.2.13 The preparation, presentation and correction of the section and typical profile of cast-in-place concrete for approval;
 - 5.2.3.1.2.14 The preparation, supply and repair of cracks exceeding the specific requirements of the specifications;
 - 5.2.3.1.2.15 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
 - 5.2.3.1.2.16 Any incidental expenses and coordination.
- 5.2.3.2 Item 5.2.3.2 Reinforcing Galvanized Steel
- 5.2.3.2.1 Payment item 5.2.3.2 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
 - 5.2.3.2.2 These prices include, but are not limited to, the following:
 - 5.2.3.2.2.1 The preparation, presentation and correction of the Work Plan, the shop drawings and the slip concerning the laying of steel bar;
 - 5.2.3.2.2.2 The mobilization of labor, tools and equipment required for the execution of the work;
 - 5.2.3.2.2.3 The supply of reinforcing bars and the shaping thereof;
 - 5.2.3.2.2.4 Galvanizing when stipulated in plans and specifications;
 - 5.2.3.2.2.5 Field cuts and adjustments;
 - 5.2.3.2.2.6 The laying of reinforcing steel required;
 - 5.2.3.2.2.7 The rebar installation confirmation table and a revision of the installation slip;

5.2.3.2.2.8 Any incidental expenses and coordination.

5.2.3.3 Item 5.2.3.3 Chemical anchorage (galvanized steel)

5.2.3.3.1 Payment item 5.2.3.3 of the *Bid Form* is priced per unit of chemical anchor, in accordance with the requirements of the drawings and specifications

5.2.3.3.2 Price includes, but is not limited to, the following :

5.2.3.3.2.1 The preparation, presentation, and correction of shop drawings and anchor chemical technical sheet;

5.2.3.3.2.2 Mobilization of labor, tools and equipment required for the execution of the work;

5.2.3.3.2.3 Drilling and cleaning of holes for the installation of chemical anchors of upper seat repairs;

5.2.3.3.2.4 The supply, handling, transport and installation of steel anchor rods and anchor chemicals;

5.2.3.3.2.5 The execution of tests on control anchorages, in accordance with Section 03 30 03 – *Concrete Repair*;

5.2.3.3.2.6 The confirmation installation table of reinforcement bars and a revision of the installation slip;

5.2.3.3.2.7 Any incidental expenses and coordination

5.2.4 Item 5.2.4 Crack injection

5.2.4.1 Item 5.2.4.1 Mobilization/demobilization (crack injection)

5.2.4.1.1 This compensation constitutes full compensation for the mobilization/demobilization of crack injection, as well as all other elements required by the "Tender Documents".

5.2.4.2 Item 5.2.4.2 Crack injection

5.2.4.2.1 This compensation constitutes full compensation for the injection of cracks, as well as all other elements required by the "Tender Documents".

5.2.5 Item 5.2.5 Demolish the remaining pillar of the old power plant

5.2.5.1 Payment item 5.2.5 of the *Bid Form* is per unit for the demolition of the entire pillar the quantities are calculated according to the theoretical dimensions, in accordance with the specifications of the drawings and specifications.

5.2.5.2 These prices include, but are not limited to, the following:

5.2.5.2.1 The preparation, presentation and correction of the demolition procedure and the Work Plan concerning the demolition of the pillar;

5.2.5.2.2 Mobilization of labor, tools and light equipment required for the execution of the work , taking into account access constraints;

- 5.2.5.2.3 Demolition of the defective and sound concrete of the entire pillar as indicated by the Parks Canada Representative;
- 5.2.5.2.4 Treatment of surplus materials in accordance with Section 01 74 19 – *Waste Management and Disposal*;
- 5.2.5.2.5 Any incidental expenses and coordination.

5.2.6 Item 5.2.6 Consolidate erosion with cement-sand bags at the bottom of the wall of the old power plant.

- 5.2.6.1 This compensation constitutes full compensation for the supply and installation of sand-cement bag in the bottom wall of the old powerhouse plant as indicated by the Parks Canada representative, as well as all other elements required by the "Tender Documents".

5.3 ELECTRICITY WORKS FOR THE REHABILITATION OF THE SPILLWAY 3

5.3.1 CEMA 3R exterior cabinet and components

- 5.3.1.1 The price is a lump sum. This item includes the supply and installation of a CEMA 3R cabinet, a meter socket with a main circuit breaker, an electrical distribution panel with circuit breakers, ducts, wiring, fasteners, hardware and accessories, as well as any incidental expenses required to carry out the work as described in the documents..

5.3.2 Branch mast

- 5.3.2.1 The price is a lump sum. This item includes the provision and installation of a connecting mast, conductors, ducts, wiring, fasteners, hardware and accessories, as well as any incidental expenses required to carry out the work as described in the documents.

5.3.3 Grounding

- 5.3.3.1 The price is a lump sum. This item includes the supply and installation of two grounding rods, grounding cable, duct, inspection boxes, aluminothermic welding connections, fasteners, hardware and accessories, as well as any incidental expenses required to carry out the work as described in the documents.

5.3.4 Replacement of the control panel power system feeder circuit

- 5.3.4.1 The price is a lump sum. This item includes the supply and installation of conductors, ducts, expansion joints, connectors, supports, fasteners, hardware and accessories, as well as any incidental expenses required to carry out the work as described in the documents.

5.3.5 Lighting fixture

- 5.3.5.1 The price is per unit for this work. This item includes the supply and installation of the light fixture, photoelectric cell, bracket, conductors, ducts, expansion joint, connectors, supports, fasteners, hardware and accessories as well as any incidental expenses required to carry out the work as described in the documents.

5.3.6 Service pole

5.3.6.1 The price is per unit for this work. This item includes the supply and installation of the wood service pole, accessories, cables, supports, equipment and implementation as well as any incidental expenses required to carry out the work as described in the documents.

5.3.6.2 The price also includes excavation and backfilling, supplying and installation of embankments, and the layout of materials.

5.3.7 Demolition

5.3.7.1 The price is a lump sum. This item includes the removal of materials, unplugging equipment, disposal and disposal of materials, provision of equipment and implementation as well as any incidental expenses required to carry out the work as described in the documents.

5.3.7.2 The price also includes the support, transportation and unloading of the following existing equipment at the Canada Park Agency's workshops located at 1840 Burgundy in Chambly, either; the meter socket and its circuit breaker, the distribution panel and circuit breakers, the receptacles, the projector, the wooden pole and the photoelectric cell.

5.4 FINAL REPAIR WORK FOLLOWING THE THAW

5.4.1 Item 5.4.1 – Topsoil

5.4.1.1 Payment item 5.4.1 of the *Bid Form* is priced per square metre (m²), based on the area covered in accordance with the requirements of the drawings and specifications.

5.4.1.2 Price includes, but is not limited to, the following:

5.4.1.2.1 The preparation of the ground for the placement of the topsoil;

5.4.1.2.2 The supply of the material, loading, transport, spreading, leveling, stripping, removal of woody debris and waste, and any amendments necessary to make the material in accordance with drawings and specifications;

5.4.1.2.3 The area payable to the Contractor shall be the area measured in place, once the work has been completed. Any excess over the lines defined by the Parks Canada Representative at the work site shall be at the Contractor's expense;

5.4.1.2.4 Any incidental expenses and coordination.

5.4.2 Item 5.4.2 – Sodding with Turf Grass

5.4.2.1 Payment item 5.4.2 of the *Bid Form* is priced per square metre (m²) for sodding with turf grass, in accordance with the requirements of the drawings and specifications.

5.4.2.2 Measure sodding with turf grass per square metre of sodded area.

5.4.2.3 Price includes, but is not limited to, the following:

5.4.2.3.1 The supply, implementation of materials in accordance with the plans and directives of the Parks Canada Representative;

- 5.4.2.3.2 Recovery of sodding of portions of covered surfaces by less than 75% shoot height 150 mm;
- 5.4.2.3.3 Protection and maintenance of turf;
- 5.4.2.3.4 Cleaning of premises;
- 5.4.2.3.5 First lawn mowing;
- 5.4.2.3.6 Costs related to all other areas damaged by the work are considered miscellaneous and are included in the price of the restoration of the site.
- 5.4.2.3.7 Any incidental expense and coordination.
- 5.4.2.4 The submitted price is paid as shown below:
 - 5.4.2.4.1 75% of the price after initial sodding to the satisfaction of the Parks Canada Representative;
 - 5.4.2.4.2 25% of the price after the first lawn mowing to the satisfaction of the Parks Canada Representative.

6 Syphon 2

6.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

- 6.1.1 General expenses, mobilization, demobilization, traffic maintenance, taking videos of the inventory and signaling
 - 6.1.1.1 The price is a lump sum. This item includes the mobilization and demobilization of personnel and equipment on site, the implementation of all health / safety requirements, obtaining permits and permit fees, coordination and procedures at the City of Chambly for works in the municipal right-of-way, all costs for board and lodging and subsistence, installation and maintenance of the construction trailer, chemical toilets, fences, supply and the installation of a new chain link fence or an opening in the existing fence for temporary access to the site (if required), including concrete, poles, bars, fasteners, and wire fencing. This item also includes the installation and maintenance of temporary signaling according to Ministry of Transports of Quebec standards, including temporary signaling, coordination with authorities, costs of surveying, picket of works and costs of surveys that are not charged to any item of the Bid Form, site security costs (if necessary), protection of existing public utilities in the work areas as well as all the other elements required by the "Tender Documents".
 - 6.1.1.2 This item also includes the supply and installation of materials for making temporary cofferdams in water streams in the required places, including those shown on the plans.
 - 6.1.1.3 The lump sum price submitted for the work provided for in this item is payable in the following manner:
 - 6.1.1.3.1 A first payment of 30% of the lump sum bid price for this item is payable when the general mobilization is completed.
 - 6.1.1.3.2 A second payment of 50% of the lump sum bid price for this item is payable in proportion to the estimate of the work.

6.1.1.3.3 The balance of the lump sum bid for this item is payable when the general demobilization is fully completed.

6.1.2 Winter conditions

6.1.2.1 The price is a global lump-sum amount for all expenses incurred in installing the necessary facilities for performance of the work in cold weather, as well as costs not included in other payment items in the Bid Form, in accordance with the specifications.

6.1.2.2 The price includes but is not limited to the following:

6.1.2.2.1 Preparation, presentation and correction, if required, of the description of facilities. Snow removal.

6.1.2.2.2 Mobilization of labour, tools and equipment required for performance of the work.

6.1.2.2.3 Supply, handling and transportation of materials required to build the facilities.

6.1.2.2.4 Installation, maintenance during the work and dismantling of temporary facilities upon work completion.

6.1.2.2.5 Heating of temporary facilities during the work.

6.1.2.2.6 Transportation of materials off-site.

6.1.2.2.7 Any incidental expenses.

6.1.2.2.8 Winter conditions are payable only if required, in writing, by the Parks Canada Representative.

6.1.2.2.9 The bid price shall be paid as follows:

6.1.2.2.10 60 % of the amount after assembly of facilities to the Parks Canada Representative's satisfaction.

6.1.2.2.11 40 % of the amount after removal from the site of materials used in building the facilities.

6.2 SYPHON 2 REHABILITATION WORK

6.2.1 New concrete structure

6.2.1.1 The price is a lump sum. This item constitutes full compensation for drying out the excavation and demolition of the existing manhole, supply and installation of the new prefabricated manhole including accessories, connection to the existing syphon, seat, coating, the galvanized steel grid, the backfilling, the repair of the cycle path, the transportation and off-site disposal of excavated materials in a site that meets the requirements of the MELCC, as well as all the other elements required by the "Tender Documents".

6.2.2 450mm diameter culvert including grid at outlet

6.2.2.1 The price is a lump sum. This item constitutes full compensation for the supply and installation of the new culvert, the grid, the accessories, the excavation, the backfilling, the surface repair, as well as all the other elements required by the "Tender Documents".

6.2.3 Pumping during works

- 6.2.3.1 The price is a lump sum. This item includes the supply of pumps to direct the water from the ditch upstream of the syphon 2 downstream while respecting the environmental standards for the protection of fauna, as well as all other required places shown or not on the plans.
- 6.2.3.2 This item also includes, if necessary, the measurements of the drawdown of the tablecloth below the level of the seat of the manhole.
- 6.2.3.3 The Contractor must provide the pumping system plans to the Parks Canada representative before the start of work for approval.
- 6.2.4 Cleaning the ditch downstream of the syphon
- 6.2.4.1 The price is an amount per linear meter for this work. This item consists of regrooving the ditch to the original depth. However, the sedimented materials shall be excavated only at the bottom of the ditch. The vegetation of the ditch slopes is left in place to ensure its stability
- 6.2.4.2 This item also includes the transportation and off-site disposal of excavated materials in a site that meets the requirements of the MELCC.

7 Syphon 3

7.1 PREPARATION, SECURING OF PREMISES AND GENERAL FIXED EXPENSES

- 7.1.1 General expenses, mobilization, demobilization, traffic maintenance, taking videos of the inventory and signaling
- 7.1.1.1 6.2.2.1 The price is a lump sum. This item includes the mobilization and demobilization of personnel and equipment on site, the implementation of all health / safety requirements, obtaining permits and permit fees, coordination and procedures at the City of Chambly for works in the municipal right-of-way, all costs for board and lodging and subsistence, installation and maintenance of the construction trailer, chemical toilets, fences, supply and the installation of a new chain link fence or an opening in the existing fence for temporary access to the site (if required), including concrete, poles, bars, fasteners, and wire fencing. This item also includes the installation and maintenance of temporary signaling according to Ministry of Transports of Quebec standards, including temporary signaling, coordination with authorities, costs of surveying, picket of works and costs of surveys that are not charged to any item of the Bid Form, site security costs (if necessary), protection of existing public utilities in the work areas as well as all the other elements required by the "Tender Documents".
- 7.1.1.2 This item also includes the supply and installation of materials for making temporary cofferdams in water streams in the required places, including those shown on the plans.
- 7.1.1.3 The lump sum price submitted for the work provided for in this item is payable in the following manner:
- 7.1.1.3.1 A first payment of 30% of the lump sum bid price for this item is payable when the general mobilization is completed.
- 7.1.1.3.2 A second payment of 50% of the lump sum bid price for this item is payable in proportion to the estimate of the work.

7.1.1.3.3 The balance of the lump sum bid for this item is payable when the general demobilization is fully completed.

7.1.2 Winter conditions

7.1.2.1 The price is a global lump-sum amount for all expenses incurred in installing the necessary facilities for performance of the work in cold weather, as well as costs not included in other payment items in the Bid Form, in accordance with the specifications.

7.1.2.2 The price includes but is not limited to the following:

7.1.2.2.1 Preparation, presentation and correction, if required, of the description of facilities. Snow removal.

7.1.2.2.2 Mobilization of labour, tools and equipment required for performance of the work.

7.1.2.2.3 Supply, handling and transportation of materials required to build the facilities.

7.1.2.2.4 Installation, maintenance during the work and dismantling of temporary facilities upon work completion.

7.1.2.2.5 Heating of temporary facilities during the work.

7.1.2.2.6 Transportation of materials off-site.

7.1.2.2.7 Any incidental expenses.

7.1.2.2.8 Winter conditions are payable only if required, in writing, by the Parks Canada Representative.

7.1.2.2.9 The bid price shall be paid as follows:

7.1.2.2.10 60 % of the amount after assembly of facilities to the Parks Canada Representative's satisfaction.

7.1.2.2.11 40 % of the amount after removal from the site of materials used in building the facilities.

7.2 SYPHON 3 REHABILITATION WORK

7.2.1 Structural lining of the syphon 3 culvert including surface preparation and cleaning

7.2.1.1 The price is per linear meter for this work. This remuneration constitutes full compensation for the preparatory and verification stages prior to the making of the structural lining, the supply and installation in the existing reception culvert of a structural lining for the rehabilitation of pipes, as described in these specifications, also including the required pre- and post-rehabilitation television inspections, cleaning, sealing testing, finding and repairing leaks, as well as all the other elements required by the "Tender Documents"

7.2.2 Pumping during the works

7.2.2.1 The price is a lump sum. This remuneration constitutes full compensation for the supply and installation of pumps required to dry out the work areas required in the ditch and allow access to the syphon3, as well as all the other elements required by the "Tender Documents".

7.2.2.2 This item also includes, if necessary, the measures for lowering the tablecloth below the level of the syphon seat.

- 7.2.2.3 The Contractor must provide the pumping system plans to the Parks Canada representative before the start of work for approval.
- 7.2.2.4 Traffic maintenance and temporary signaling.
- 7.2.2.5 This remuneration constitutes full compensation for the installation and maintenance of temporary signaling according to Ministry of Transports of Quebec standards, including temporary signaling, coordination with the authorities, as well as all the other elements required by the “Tender Documents”.
- 7.2.3 TV inspection and report
- 7.2.3.1 The price is a lump sum. The TV inspection of the culvert should be completed by a specialized company and using a rotary head camera, the supply of a TV inspection report including pictures and USB, the repair of the defects noted by this inspection, as well as all the other elements required by the “Tender Documents”.

END OF SECTION

PROJECT MEETINGS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition – Minor Works.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete.
- .5 Section 03 30 03 – Concrete Repair.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Section 31 32 19.16 – Geotextile Soil Stabilization.
- .8 Section 31 62 27 – Cofferdam.
- .9 Section 32 92 23 – *Sodding*.

1.2 PRICES AND PAYMENT

- .1 The costs of project meetings must be included in the bid prices for each relevant item of the Tender Form.

1.3 ADMINISTRATIVE

- .1 Plan to hold project meetings every two (2) weeks throughout the duration of the work.
- .2 The Principal Supervisor prepares agenda for meetings.
- .3 The Principal Supervisor distributes a written notice of each meeting five (5) working days prior to the meeting date to the Contractor, the Parks Canada Agency (PCA) project manager, the Principal Supervisor, and the Design Engineer (when required).
- .4 Provide physical space and plan for meetings.
- .5 The Principal Supervisor presides at meetings.
- .6 The Principal Supervisor records the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Distribute copies of meeting minutes within seven (7) working days after meetings to meeting participants and affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .9 Provide a schedule of specific meeting indicated in all specification section to allow tracking of work execution and all other meeting required.

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PROJECT MEETINGS

1.4 PRECONSTRUCTION MEETING

- .1 Within ten (10) working days after emission of contract award letter, Parks Canada Representative organise a kick-off meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
- .2 The PCA project manager, the Principal Supervisor, the Design Engineer, as well as the Contractor and the main Subcontractors will be in attendance.
- .3 The Parks Canada Representative establishes time and location of meeting and notifies parties concerned at least five (5) working days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work;
 - .2 Site development plan;
 - .3 Order of execution of Works;
 - .4 Shop Drawing of temporary access system (footbridge);
 - .5 Overall plans (GANTT diagram) and the schedule of work;
 - .6 Signaling plans;
 - .7 Surveys;
 - .8 Environmental Protection Plan (EPP);
 - .9 Schedule of submission of shop drawings, samples, colour chips, procedure. Submit submittals in accordance with Section 01 33 00 – *Submittal Procedures*;
 - .10 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – *Construction Facilities*;
 - .11 Delivery schedule of specified equipment, for each structure;
 - .12 Site security in accordance with Section 01 56 00 – *Temporary Barriers and Enclosures*;
 - .13 Proposed changes, change orders, procedures, approvals required, mark-up, administrative requirements;
 - .14 Owner provided products;
 - .15 Record drawings in accordance with Section 01 33 00 – *Submittal Procedures*;
 - .16 Take-over procedures, acceptance, and warranties;
 - .17 Monthly progress claims, administrative procedures, photographs, hold backs;
 - .18 Appointment of inspection and testing agencies of Contractor and of Canada Parks Agency;
 - .19 Insurances, transcript of policies.

PROJECT MEETINGS

1.5 PROGRESS MEETINGS

- .1 The Parks Canada Representative shall establish a schedule of the progress meetings to be held every two (2) weeks during the Work, until its completion.
- .2 Contractor, major Subcontractors involved in Work, the PCA project manager, and the Principal Supervisor are to be in attendance.
- .3 Parks Canada Representative notifies parties a minimum of five (5) working days prior to meetings.
- .4 The Contractor must submit to the Parks Canada Representative a work schedule based on the real progress of the work a minimum of twenty-four (24) hours prior to the meetings. The presented schedule must compare the real progress to the original work schedule.
- .5 Government Representative records minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) working days after meeting.
- .6 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting;
 - .2 Review of Work progress since previous meeting;
 - .3 Field observations, problems, conflicts;
 - .4 Health and safety;
 - .5 Problems which impede construction schedule;
 - .6 Review of off-site fabrication delivery schedules;
 - .7 Corrective measures and procedures to regain projected schedule;
 - .8 Revision to construction schedule;
 - .9 Progress schedule, during succeeding work period;
 - .10 Review submittal schedules: expedite as required;
 - .11 Maintenance of quality standards;
 - .12 Review proposed changes for effect on construction schedule and on completion date;
 - .13 Other business.

1.6 MEETINGS PRIOR TO IMPLEMENTATION

- .1 Must be in attendance: The Contractor including the Engineer who signed the procedure, and all principal Subcontractors participating in the work, the Laboratory Testing Representative, and the Principal Supervisor.
- .2 The Parks Canada Representative shall advise the parties at least five (5) days prior to the meetings.

PROJECT MEETINGS

- .3 The meeting shall only take place once the procedure has been judged complete by the Parks Canada Representative. The meeting agenda shall include a review of the procedure and the contractual requirements for the work.

END OF SECTION

**CONSTRUCTION
PROGRESS
SCHEDULE BAR (GANTT)
CHART**

Part 1 General

1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five (5) days work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 **Master Plan:** summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 **Project Schedule:** planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involve using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by the Parks Canada Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.

**CONSTRUCTION
PROGRESS
SCHEDULE BAR (GANTT)
CHART**

- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Submit to the Parks Canada Representative within **seven (7) working days** of the contract award letter emission a Bar (GANTT) Chart as **Master Plan** for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to the Parks Canada Representative within **five (5) working days of receipt of approval of Master Plan**.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule, according with work planned in Tender Form:
- .1 Repair type 1 walls without overlay;
 - .2 Repair type 2 walls with overlay;
 - .3 Repair type 3 without overlay of arch's underside of sluice gates wall;
 - .4 Reconstruction/Demolition of some elements;
 - .5 Surveys;
 - .6 Any other work shown on drawings, specifications, and Tender Form.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 The Parks Canada Representative will review and return revised schedules within **five (5) working days**.
- .3 Revise impractical schedule and resubmit within **five (5) working days**.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes, as minimum, milestone and activity types as follows:
- .1 Award letter, Contract attribution;
 - .2 Shop Drawings, samples and time to settle;
 - .3 Permits;
 - .4 Mobilization/demobilisation;

**CONSTRUCTION
PROGRESS
SCHEDULE BAR (GANTT)
CHART**

- .5 Minimally one activity for each article of the Bid Form;
- .6 Curing time;
- .7 Key milestones of the Project and any other tasks or deliverables required.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on **weekly** basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 FOUR (4) WEEKS SCHEDULE

- .1 Develop a (4) weeks schedule presenting the main activities.
- .2 The four (4) week schedule must include the following criteria:
 - .1 The previous week with the confirmation of execution of the main activities;
 - .2 The current week with planned main activities;
 - .3 Next two (2) weeks with planned main activities;
 - .4 Update four (4) week schedule once a week and forward it to Parks Canada Representative.

1.9 WORK PROGRESS FOLLOW-UP PLAN

- .1 Develop a graphical follow-up from the intervention sector plans to present the productivity of key activities, such as: excavation, demolition, concreting and others.
- .2 Update this follow-up plan before each site meeting each two (2) weeks.

1.10 PROJECT MEETINGS

- .1 Hold meetings in accordance with section 01 31 19 – *Project Meetings*.
- .2 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .3 Weather related delays with their remedial measures will be discussed and negotiated.

END OF SECTION

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.

1.2 ADMINISTRATIVE

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

1.3 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status. The Contractor must provide the end-of-project manual.

END OF SECTION

HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition – Minor Works.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete.
- .5 Section 03 30 03 – Concrete Repair.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Section 31 32 19.16 – Geotextile Soil Stabilization.
- .8 Section 31 62 27 – Cofferdam.
- .9 Section 32 91 19.13 – Topsoil Placement and Grading.
- .10 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada, Workplace Hazardous Materials Information System (WHMIS)
- .3 Province of Quebec
 - .1 Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1- 2014 update.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within seven (7) working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site-specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit two (2) copies of Contractor's authorized representative's work site health and safety inspection reports to the Parks Canada Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit the WHMIS Material Safety Data Sheets (MSDS).

HEALTH AND SAFETY REQUIREMENTS

- .7 The Parks Canada Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within seven (7) working days after receipt of plan. Revise plan as appropriate and resubmit plan to Parks Canada Representative within five (5) working days after receipt of comments from the Parks Canada Representative.
- .8 The Parks Canada Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Parks Canada Representative.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

- .1 The Contractor must send a written work advisory to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) at least ten (10) working days prior to the beginning of work.

1.5 SAFETY ASSESSMENT

- .1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.
- .2 Conduct an assessment of the risks and safety hazards present on the site in relation to the works to be performed.
- .3 It is the responsibility of the Contractor to conduct audits to ensure the safety of the work done near the Chambly Canal Walls and structures. These checks are needed to avoid the risks of instability or collapse of the walls.

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meetings with the Parks Canada Representative prior to commencement of Work.
- .2 Notify the Parks Canada Representative at least five (5) days before this meeting.

1.7 REGULATORY REQUIREMENTS

- .1 Perform the Works in accordance with the requirements of the authorities having jurisdiction over the City of Chambly territory.

1.8 GENERAL REQUIREMENTS

- .1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his

HEALTH AND SAFETY REQUIREMENTS

subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

- .2 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .3 The Parks Canada Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that conduct of Work may affect them.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Contractor shall be the Principal Contractor as described in the Quebec Act Respecting Health and Safety code for the Construction for only their scope and areas of work as defined and described this project specification.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with the health and safety regulations, Loi sur la santé et la sécurité du travail, Règlement sur les établissements industriels et commerciaux, R.R.Q.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occurs during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction and notify the Parks Canada Representative verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Possess practical construction site experience involving activities associated with concrete repair, electrical works, and paving works.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and the Parks Canada Representative following his instructions.

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HEALTH AND SAFETY REQUIREMENTS

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Canadian government, and in consultation with the Parks Canada Representative.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Parks Canada Representative.
- .2 Provide Parks Canada Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Parks Canada Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

- .1 Blasting and other use of explosives are not allowed.

1.16 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from the Parks Canada Representative.

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 14 00 – Work Restrictions
- .3 Section 01 33 00 – Submittal Procedures
- .4 Section 01 35 43b – Archeology
- .5 Section 01 74 11 – Cleaning
- .6 Section 01 74 19 – Waste Management and Disposal

1.2 REFERENCE STANDARDS

- .1 Ensure environmental protection in accordance with these specifications and the following standards:
 - .1 Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés (MDDELCC, 2016);
 - .2 Ministère du Développement durable, de l'Environnement et des Parcs du Québec : Guide d'échantillonnage à des fins d'analyses environnementales : Cahier 5 – Échantillonnage des sols, 2010 ;
 - .3 Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs du Québec, Modes de conservation pour l'échantillonnage des sols, 2013;
 - .4 Canadian law on the environmental protection (1999) (L.C. 1999, ch. 33)
 - .5 Canadian Environmental Quality Guidelines (CEQGs, 1999);
 - .6 Fisheries Act (R.S.C., 1985, c. F-14);
 - .7 The Règlement numéro 2008-47 sur l'assainissement des eaux de La Communauté métropolitaine de Montréal (CMM);
 - .8 Quebec laws and regulations:
 - .1 Law on the species at risk (L.C. 2002, ch. 29).
 - .2 Law of 1994 on the Convention on Migratory Birds (L.C. 1994, ch. 22)
 - .3 Critères de qualité de l'eau de surface du MELCC (protection de la vie aquatique – effet aigu)
 - .4 Historic Canal Regulations (SOR / 93-220)
 - .5 Environment Quality Act (CQLR, c Q-2), 2018;
 - .6 Regulation respecting solid waste (CQLR, c Q-2, r 13), 2013;
 - .7 Regulation respecting the burial of contaminated soils (CQLR, c Q-2, r 18), 2018;

- .8 Regulation respecting the landfilling and incineration of residual materials (CQLR, c Q-2, r 19), 2018;
 - .9 Regulation respecting hazardous materials (CQLR, c Q-2, r 32), 2018;
 - .10 Land Protection and Rehabilitation Regulation (CQLR, c Q-2, r 37), 2018;
 - .11 Regulation respecting contaminated soil storage and contaminated soil transfer stations (CQLR, c Q-2, r 46), 2018;
- .2 The standards and general documents cited above are complementary, regardless of the nature of work to be done. In the event of a discrepancy between the documents and these specifications, the specifications have priority.

1.3 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Before the work
 - .1 Health and safety plan
 - .2 Schedule of work
 - .2 During the work
 - .1 Weight tickets
- .2 Five (5) days before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Canada Parks Representative.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan must include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .11 Waste Water Management Plan identifying methods and procedures for management of discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .12 A plan for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .13 Pesticide treatment plan to be included and updated, as required.

1.5 MITIGATION MEASURES

- .1 The mitigation measures described in Appendix D of this specification must be implemented to the satisfaction of the Canada Parks Representative.

1.6 FIRES

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

1.7 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and

reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements in an aquatic environment the applicable discharge standards, i.e. the CCME recommendations for water quality - protection of aquatic life, the MELCC surface water quality criteria (protection of aquatic life - effect acute) and CMM regulation 2008-47 for suspended solids, pH and C10-C50. It is the responsibility of the contractor to demonstrate compliance with these standards.

1.8 PLANT PROTECTION

- .1 Where required for excavation, cut roots as directed:
 - .1 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to a minimum height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 No tree may be cut without the approval of the Representative of Parks Canada, except those indicated on the plans. These must be identified beforehand and approved by the client and the Representative of Parks Canada.

1.9 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Install geotextile over the fences around the site to prevent wind erosion. Keep the geotextile in good condition throughout the work.
- .3 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

- .5 Do not use chemicals in water spray systems to reduce the emission of dust and particles.

1.10 HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 Preserve the archeological nature of the site in accordance with Section 01 35 43b – Archeology.

1.11 NOTIFICATION

- .1 The Canada Parks Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform the Canada Parks Representative of proposed corrective action and take such action for approval by the Canada Parks Representative.
- .1 Take action only after receipt of written approval by the Canada Parks Representative.
- .3 The Canada Parks Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 EXECUTION

2.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .4 Waste Management: separate waste materials for recycling and reuse.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

ARCHEOLOGY

1.1 RELATED REQUIREMENTS

1. Section 01 11 00 – Summary of Work
2. Section 01 14 00 – Work Restrictions
3. Section 01 35 43 – Environmental Procedures

1.2 SPECIFIC CONDITIONS

1. The site of the rehabilitation works has been recognized by the Canadian Government as an area with archaeological potential. Therefore, any excavation of soil that may contain archeological remains must be supervised by an archeologist appointed by the Canadian government.
2. Due to the high probability of finding archeological remains during the planned excavations, these works are subject to the terms set out in this section.

1.3 ACCESS AND COOPERATION

1. The Contractor shall cooperate and comply with all directives issued by the Canada Parks Representative during excavation works to prevent the loss of archeological information at the site.
2. The Contractor shall facilitate access to works and cooperate with the archeologist. The archeologist or his representative shall work at the site as needed to protect and record any remains. Their role will be to guide the Contractor to avoid any loss of archeological information and to collect information about any remains found.
3. If necessary, the Contractor shall allow the archeological team to conduct tests and take archeological samples.

1.4 ARCHEOLOGICAL FINDINGS

1. The Contractor shall inform the Parks Canada representative, or in his absence the archeologist or his representative, of any archeological findings (construction or housing remains, objects or pieces of objects) from the site and wait for directives prior to continuing work where the item was found.
2. Remains, antiquities and other objects of historical, archeological or scientific interest (remains, object or fragment of object) found on the work site, excavation zone or demolition zone shall remain Crown property. The Contractor shall protect any such findings and obtain instructions from the Canada Parks Representative.

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ARCHEOLOGY

1.5 WORK STOPPAGE

1. In its contract, the Contractor shall include, at its expense, excavation stoppages of approximately 30 minutes per half-day in areas where an archeologist is required to be present. If unused, these stoppages shall be accumulated and may be used at a later date, as needed. A record of unused time shall be kept by the Canada Parks Representative in accordance with the Contractor and the archeologist.
2. In the event of a work stoppage exceeding 30 minutes, the Canada Parks Representative shall assess the implications of the stoppage and shall inform the Contractor. The Contractor may have to use its machinery in another area to allow the archeologists to continue their work. If it is not possible to use the machinery in another area, the Contractor shall be compensated in the bank of hours or, if it is empty, in accordance with agreements established at the start-up meeting.
3. In the event that cultural resources are discovered when an archeologist is not present, the Project Manager/Project Owner shall imperatively suspend work in the immediate area of the discovery and inform the Parks Canada Agency Project Lead.

1.6 MANUAL EXCAVATIONS FOR ARCHEOLOGICAL PURPOSES

1. Given the possibility of making archeological discoveries, the Contractor is advised that, during the works, manual excavation may be required along with any other types of work to protect possible discoveries. The Contractor shall be compensated in accordance with predetermined agreements.

1.7 PROTECTION OF REMAINS AND STRUCTURES

1. The Contractor shall take all reasonable precautions during excavations and other works to protect any uncovered remains and to allow their examination by archeologists. Parks Canada will not tolerate any deviation in this regard. If the Contractor's negligence results in damage to remains, the Contractor shall be held responsible and the Canada Parks shall determine the impact.
2. In the event that the Canada Parks Representative authorizes the demolition of archeological elements at the site, the Contractor shall take the necessary precautions to protect any adjacent archeological structures that are not slated for demolition. Elements shall be demolished progressively and in a controlled manner after all archeological surveys are complete. If structures are damaged during the works, immediately inform the Parks Canada Representative.

END OF SECTION

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QUALITY CONTROL

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition – Minor Works.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete.
- .5 Section 03 30 03 – Concrete Repair.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Section 31 32 19.16 – Geotextile Soil Stabilization.
- .8 Section 31 62 27 – Cofferdam.
- .9 Section 32 91 19.13 – Topsoil Placement and Grading.
- .10 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 Soil and aggregate control guide (2019), Road Project Management Department, (MTQ) - « *Guide de contrôle de la qualité des sols et des granulats (2018); Direction de la gestion des projets routiers; Ministère des Transport (MTQ)* »
- .2 Concrete control guide (2019), Road Project Management Department, (MTQ) - « *Guide de contrôle de la qualité du béton (2019); Direction de la gestion des projets routiers; Ministère des Transport (MTQ)* »

1.3 INSPECTION

- .1 Allow the Parks Canada Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by the Parks Canada Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections, or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

QUALITY CONTROL

- .4 The Parks Canada Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, the Parks Canada Representative shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AND TESTING AGENCIES

- .1 **The Contractor is responsible to execute all required tests to ensure compliance with contractual requirements (concrete, soil and aggregate).**
- .2 The Parks Canada Agency (PCA) will be responsible for engaging the services of independent testing and inspection bodies (lab) in order to carry out additional tests. The cost of these services will be borne by the PCA. This does not absolve the Contractor to carry out tests to meet contractual requirements and provide test details and results.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Parks Canada Representative at no cost to the Parks Canada Representative. Pay costs for retesting and re-inspection.

1.5 ACCESS TO WORK

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

1.6 PROCEDURES

- .1 Notify appropriate agency and the Parks Canada Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- .4 The Contractor must take notice and apply the quality control procedure of different guide indicated at point 1.2 *References (concrete, soil and aggregate)* according to all different works to do.

QUALITY CONTROL

1.7 REJECTED WORK

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

1.8 CERTIFICATION

- .1 Where certification is required on plans and specifications, the Contractor shall provide a copy of the certificate to Parks Canada prior to commencement of work subject to this requirement. The certificate must be valid for the duration of this work.

1.9 COMPLIANCE CERTIFICATION

- .1 Where a certificate of compliance is required on drawings and specifications, the contractor may not use any material for which such a certificate has not been transmitted to the Parks Canada Representative.
- .2 The manufacturer of the material must sign this certificate of compliance. The certificate of compliance and the receipts for the delivery of the materials must be drawn up in such a way that they can be linked. The Contractor must return the certificate of compliance to the Parks Canada Representative within the prescribed time.
- .3 If the Contractor is unable to provide all required information to the drawings and specifications, the Contractor shall at its own expense use a registered laboratory to provide missing information on the certificate of compliance. The attestation of compliance must then be signed by the representative of the laboratory which executed the tests.

1.10 QUALIFICATION

- .1 Where a design is required, the Contractor shall provide a copy of the certificate to Parks Canada prior to the commencement of work subject to this requirement. The certificate must remain valid for the duration of the work.

1.11 REPORTS

- .1 Submit four (4) copies of inspection and test reports to the Parks Canada Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

QUALITY CONTROL

1.12 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Parks Canada Representative and may be authorized as recoverable.

1.13 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1.1 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-last edition, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59- last edition, Alkyd Exterior Gloss Enamel.
- .2 CSA Group (CSA)
 - .1 CSA-A23.1/A23.2- last edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121 last edition, Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2 last edition, Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321- last edition, Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA) / Office Water
 - .1 EPA 832-R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plan and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.
- .2 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation. Provide this plan five (5) business days before start of work. Construction trailers are only allowed in the siphon sector 1 and the spillway 3 sector to serve all sites. Fees must be included in the cost of overhead.
- .3 Identify areas which have to be gravelled to prevent tracking of mud.
- .4 Indicate the areas that must be coated with a geotextile membrane and gravel to prevent soil settlement in the areas considered by PCA with archaeological potential
- .5 Indicate use of supplemental or other staging area.
- .6 Provide construction facilities in order to execute work expeditiously.
- .7 Remove from site all such work after use.

- .8 The Contractor will have free access to the main entrance to the site depending on the location of the work to be carried out:
- Siphon no 1 & workshop ditch: Rue Migneault & Avenue Bourgogne with Parc Des Ateliers
 - Weirs 1 and 2: Rue Migneault
 - Spillway no 3: Chemin Ste-Thérèse & Chemin du Canal
 - Siphon no 2: Chemin Ste-Thérèse with access route from the MTQ under the overpass of Highway 10 and rue O'Reilly
 - Siphon no 3: Chemin Ste-Thérèse (Route 223).

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain temporary stairs, ladders, swing staging, ramps, platforms and scaffolding.

1.5 HOISTING

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

1.6 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.7 CONSTRUCTION PARKING

- .1 Parking is permitted on the site, as long as it does not hinder the execution of works or reduce/encroach on the two (2) spaces needed for the Parks Canada Agency vehicle traffic and parking. A parking space for the site supervisor must also be provided.
- .2 Provide and maintain adequate access to project site.

1.8 SECURITY

- .1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

- .2 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.9 FIELD DRAINING

- .1 Provide temporary pumping and drainage facilities required to keep excavations and site free of standing water or ice.

1.10 WATER SUPPLY

- .1 The Contractor shall ensure his continuous supply of water during his work for his needs and provide all necessary measures for insulation of heating pipes according to temperature.
- .2 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.

1.11 TEMPORARY POWER SUPPLY AND TEMPORARY LIGHTING

- .1 The Contractor is responsible for the power supply required for his site.
- .2 No power source will be provided to the Contractor by PCA.
- .3 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.
- .4 Provide temporary lighting for the duration of the work and maintain the network.

1.12 OFFICES

- .1 Provide an office heated to 22 degrees C, lighted 750 lux and ventilated, of sufficient size to accommodate site meetings for a minimum of eight (8) people and furnished with a drawing laydown table. Office shall be supplied by Contractor directly on site. PCA does not provide any interior area to the Contractor.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors shall provide their own offices as necessary. Direct location of these offices.
- .4 Site office of the Agency Representative:
 - .1 Provide temporary office for the Agency Representative including a parking spot.
 - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4-50 % opening windows and one lockable door.
 - .3 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

- .4 Insulate building and provide heating system/cooling system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
- .5 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
- .6 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
- .7 The Agency Representative's site office must include a high-speed internet connection, with all connection and user fees paid for by the Contractor.
- .8 A photocopier-scanner (Color) with auto-charger in new condition, letter size (8 ½ x 11 inches), legal (8 ½ x 14 inches) and tabloid (11 x 17 inches) including stationery for the duration of contract; (Color photocopier-scanner required)
- .9 A fax machine letter (8 ½ x 11 inches) and legal (8 ½ x 14 inches), in new condition including stationery for the duration of the contract;
- .10 A microwave and small refrigerator (9 cubic feet minimum).
- .11 A hot/cold water dispenser including drinking water for the duration of the contract.
- .12 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, a sink supply with water and mirror and maintain supply of paper towels and toilet tissue.
- .13 Equip office with 1 x 2 m table, 1,2 m x 2,4 m table, 8 chairs, one office chair on wheels, garbage can, water dispenser, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .14 The Contractor must keep in place the Agency Representative's office until the final work and quantities have been accepted by the Contractor and the Agency Representative or upon request of the Agency Representative.
- .15 The contractor shall clean the facilities on a weekly basis. These facilities include the Agency Representative's private washroom and office.
- .16 Maintain in clean condition.

1.13 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.14 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.15 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by Agency Representative.
- .2 APC provides the electronic file of the panel according to its brand image. The Contractor shall ensure the printing on coroplast panels and install them on site at the time of mobilization.
- .3 No panel or sign other than the information panels shall be installed on site.
- .4 Provide and install signing panels for directing visitors near the site.
- .5 Provide construction panels consisting of a foundation, a frame including 3 copies of panels: 2 times (3'x4 ') for the bike path and 1 time (4'x6') for the public way, to be located as per Agency Representative's instructions.
 - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
 - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
 - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
 - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
 - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
 - .6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Consultant.
- .6 Locate project identification sign as directed by Consultant where indicated and construct as follows:
 - .1 Build concrete foundation, erect framework, and attach signboard to framing.
 - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
 - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .7 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols to CAN/CSA-Z321.
- .8 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Agency Representative.

In case of vandalism or damage, the Contractor shall supply new panels

1.16 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Develop access roads as well as temporary detours to maintain traffic including maintenance work on bicycle paths and / or detours

- .2 Protect travelling public from damage to person and property.
- .3 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .4 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .5 Dust control: adequate to ensure safe operation at all times.
- .6 Provide snow removal during period of Work.
- .7 No storage or parking is allowed on the bike path.
- .8 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .9 Construct access and haul roads necessary.
- .10 Provide site tracks with adequate slope and width; avoid sharp curves, blind turns and any dangerous intersection.
- .11 Provide lighting, signage, barricades and distinctive markings necessary for safe traffic.
- .12 Always take the necessary measures to remove dust to ensure the safe conduct of activities. The product used must be submitted in advance for approval.
- .13 The location, slope, width and layout of access roads and construction tracks are subject to Ministerial Representative approval.

1.17 CLEAN-UP

- .1 The Contractor must plan and provide all extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.
- .2 Remove construction debris, waste materials, packaging material from work site daily.
- .3 Clean dirt or mud tracked onto paved or surfaced roadways.
- .4 Store materials resulting from demolition activities that are salvageable.
- .5 Stack stored new or salvaged material not in construction facilities.
- .6 Ensure the cleaning of the PCA land used as an exterior backyard for the storage of materials and located downstream of siphon # 1, if it is used.
- .7 Ensure snow removal when required at various work sites, storage, temporary arrangements such as site trailers and parking, etc.

1.18

1.19 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, specific to site that complies with EPA-832-R-92-005 and requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 21 — Construction/Demolition Waste Management and Disposal.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.3 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.
- .2 Install geotextile over the fences around the site to prevent wind erosion. Keep the geotextile in good condition throughout the work.

1.4 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.5 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition – Minor Works.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete.
- .5 Section 03 30 03 – Concrete Repair.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Section 31 32 19.16 – Geotextile Soil Stabilization.
- .8 Section 31 62 27 – Cofferdam.
- .9 Section 32 91 19.13 – Topsoil Placement and Grading.
- .10 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 If there is question as to whether products or systems are in conformance with applicable standards, the Parks Canada Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .2 Cost for such testing will be borne by the Parks Canada Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

- .1 Products, materials, equipment, and articles incorporated in Work shall be new, not damaged, or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining the levels of quality and performance equal or superior. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve Contractor responsibility but is precaution against oversight or error. The Contractor must remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

COMMON PRODUCT REQUIREMENTS

- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Parks Canada Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms. Provide complete documents and complete data sheets for each product.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify the Parks Canada Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify the Parks Canada Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Parks Canada Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.
- .3 No substitution of materials will be accepted without the Parks Canada Representative approval.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Construction timber, sheet materials, panel materials, and timber on rigid supports must be placed flat such that they do not rest directly on the ground. Provide a gentle slope to encourage the flow of condensate.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

**COMMON PRODUCT
REQUIREMENTS**

- .8 Remove and replace damaged products at own expense and to satisfaction of the Parks Canada Representative.
- .9 Touch-up damaged factory finished surfaces to satisfaction of the Parks Canada Representative. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify the Parks Canada Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Government Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Parks Canada Representative to require credit or removal and re-installation at no increase in Contract Price or Contract Time. The Contractor is responsible to removal and re-installation of incorrect installation products at his expense.

1.8 QUALITY OF WORK

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

1.9 CO-ORDINATION

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

COMMON PRODUCT REQUIREMENTS

1.10 CONCEALMENT

- .1 Before installation inform the Parks Canada Representative if there is interference. Install as directed by the Parks Canada Representative.

1.11 REMEDIAL WORK

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

1.12 FASTENINGS

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

1.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Bolts may not project more than one diameter beyond nuts.
- .3 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated with written approval of the Parks Canada Representative.

**COMMON PRODUCT
REQUIREMENTS**

1.15 EXISTING UTILITIES

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PARTIE 1 GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit to the Canada Parks Representative copies of the following documents, including published updates:
 - .1 Prior to commencing work on the site submit the Health and Safety Program as indicated in this section of the specifications;
 - .2 Site opening notice;
 - .3 Immediately upon receipt, reports and instructions provided by the appropriate authorities;
 - .4 Reports of accidents or incidents, within 24 hours of their occurrence.
- .2 Submit other data, information and documents upon request of the Parks Canada Representative, as stipulated elsewhere in this section.
- .3 The Contractor must plan and provide all extraordinary measures required in accordance with government recommendations regarding Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

1.2 COMPLIANCE REQUIREMENTS

- .1 Comply with the latest version of the loi sur la santé et la sécurité au travail du Québec as well as the resulting regulations.
- .2 Observe and apply construction safety measures required by:
 - .1 Ministère des Transports du Québec – Normes ouvrages routiers - Volume V – Traffic Control Devices.
 - .2 Code de la sécurité routière du Québec.
 - .3 La Commission de la santé et de la sécurité au travail du Québec.
 - .4 Canada Occupational Safety and Health Regulations
 - .5 Standards of the Canadian Fire Marshal (CI), CI 301 - Construction Work and CI 302 - Welding and Cutting.
 - .6 Regulations and ordinances of the municipalities
 - .7 Regulations and ordinances of Canada Parks.
- .3 In case of conflict between the provisions emanating from the aforementioned authorities, the most stringent provisions shall apply.

- .4 Provide and maintain Worker's Compensation coverage for all employees throughout the duration of the contract. Prior to commencement of work, at the time of provisional execution and before the final payment, provide the Canada Parks Representative with a letter (certificate) from the Workplace Health and Safety Commission (or equivalent organization) certifying that the Contractor's account is in good standing.
 - .1 If the Contractor is a sole proprietor, provide the Canada Parks Representative with documented evidence, in a form acceptable to the Canada Parks Representative, of another personal insurance coverage that meets the above requirements for coverage workers' insurance compensation or exceeds them.

1.3 RESPONSABILITY

- .1 The Contractor must plan and provide all extraordinary measures required in accordance with government recommendations regarding Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.
- .2 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan. When the Contractor believes that the contract contains stipulations or instructions inconsistent with these laws, regulations or decrees, he must promptly notify the Canada Parks Representative in writing.
- .4 If an unexpected or special hazard or hazard occurs during the performance of the Work, immediate action shall be taken to correct the situation and to prevent any damage or injury. Inform the Canada Parks Representative verbally and in writing of the danger or situation.

1.4 SITE CONTROL AND ACCESS

- .1 Control the access points to the sites and the activities that take place there. Delimit the site and isolate it from adjacent areas by using appropriate ways to maintain control of all access points on the site.
- .2 Take measures to allow access to the site to all persons who need access. Access authorization procedures must comply with Quebec's Occupational Health and Safety Act, the regulations made under it and the Contractor's Health and Safety Program.
- .3 Ensure that persons authorized to access the site possess and wear the minimum personal protective equipment (PPE) specified in the Contractor's Health and Safety Program. Ensure that persons authorized to access the site have received the appropriate PPE, which has more stringent characteristics than the minimum equipment indicated above and designed

specifically for the activities of a site in which they participate, they have been trained to use these PPEs and wear them. Ensure the effectiveness of the supplied PPE whose characteristics are more stringent than those of the prescribed minimum equipment.

- .4 Set up signaling at access points and other strategic locations around the site, clearly indicating that the site area(s) is(are) "prohibited" to non-authorized persons. Traffic signs must be prepared according to good engineering judgement, bear well-understood graphic symbols and be bilingual (French and English). The signs are not to be used for advertising purposes, but for the specific purpose of providing information on site safety and main contacts.
 - .1 Information to be affixed to traffic signs:
 - .1 Name and description of the project
 - .2 Name of the Contractor
 - .3 Name and phone number of the project superintendent
 - .5 Ensure construction site safety at all times to prevent unauthorized access.

1.5 FILING OF NOTICE

- .1 If required, prior to commencement of work, file the Notice of Project and any other notice with the authorities and provide the Canada Parks Representative with a copy of the notices filed.

1.6 PERMITS

- .1 Obtain permits, licenses and certificates of compliance at frequencies and times prescribed by the competent authorities.
- .2 Display all permits, licenses and certificates of conformity on site and provide copies to the Canada Parks Representative.

1.7 PROJECT/SITE STATE AND CONDITIONS

- .1 The following known hazardous substances and conditions on the site must be considered as health and environmental hazards and should be managed appropriately if presented as part of the work:
 - .1 Contractors must consider known hazardous substances and conditions and must include in their price proposal all work that must be performed in or near the danger zone and in the presence of hazardous substances.
 - .2 The list of this specification shall not be construed as a complete list of all health and safety hazards present and arising from the Contractor's activities as part of the

Work. Include the above items in the hazard assessment program specified in this specification.

1.8 MEETING

- .1 Prior to commencement of work, attend a pre-work meeting led by the Canada Parks Representative. Ensure at least the presence of the project manager of the Contractor. The Canada Parks Representative must specify the time, date and location of the meeting and take care of the drafting and distribution of the minutes.
- .2 Hold site-specific health and safety meetings as required by the Quebec Occupational Health and Safety Act and Regulations.
- .3 Write and prominently post the minutes of all meetings on site. Ensure that the Parks Representative can obtain copies upon request.

1.9 HEALTH AND SAFETY PROGRAM

- .1 Under the Quebec Occupational Health and Safety Act and Regulations, Contractors must have a health and safety program. Compliance requirements for program content, details and implementation are under provincial or territorial jurisdiction. For the purpose of this contract, the health and safety program must include a site-specific health and safety plan, which recognizes, assesses and addresses the known hazardous substances and conditions identified in this specification, as well as assessments ongoing hazards during the course of the work and documenting new or potential, unknown and previously unidentified health and safety hazards.
- .2 Prior to commencement of work on the site, provide the Canada Parks Representative with a copy of the health and safety program. The copy given to the Canada Parks Representative must be used to review the program according to the requirements of the contract for known hazardous substances and conditions. The review should not be interpreted to suggest that the Canada Parks Representative approves the program as being complete, accurate, and legally compliant with the Quebec Occupational Health and Safety Act and the resulting regulations and shall not release the Contractor from its legal obligations under such a law.
- .3 Submit other data, information and documents upon request of the Parks Canada Representative, as stipulated elsewhere in this section.
- .4 The Contractor must plan and provide all extraordinary measures required in accordance with government recommendations regarding Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

1.10 DECLARATION OF ACCIDENTS

- .1 Investigate and report accidents and incidents as required by Quebec's Occupational Health and Safety Act and Regulations.
- .2 For the purpose of this contract, immediately investigate accidents or incidents involving the following situations and report to the Canada Parks Representative:
 - .1 An injury that may or may not require medical assistance, but that results in lost working time for the injured person(s).
 - .2 Exposure to toxic chemicals or substances.
 - .3 Property damage.
 - .4 Interruption of activities within or adjacent to the infrastructure that may result in losses.
- .3 During Incident and Accident Investigation and Reporting, Contractor is required to respond promptly to correct actions deemed to be the cause of accident or incident and provide written notice of the measures taken to prevent the incident or accident from recurring

1.11 PROJECT RECORDS

- .1 Maintain on site a copy of the safety documents prescribed in this section, as well as any other safety report and document obtained from the appropriate authorities.
- .2 Ensure that the Canada Parks Representative can obtain copies upon request.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition – Minor Works.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-Place Concrete.
- .5 Section 03 30 03 – Concrete Repair.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .7 Section 31 32 19.16 – Geotextile Soil Stabilization.
- .8 Section 31 62 27 – Cofferdam.
- .9 Section 32 91 19.13 – Topsoil Placement and Grading.
- .10 Section 32 92 23 – Sodding.

1.2 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to the Parks Canada Representative.
- .2 The survey must be made with the georeferenced NAD83(CSRS).

1.3 SURVEY REFERENCE POINTS

- .1 The Contractor shall make all calculations for the execution of the work and shall carry out all surveys necessary for the completion of the Contract, with exception to the work carried out by APC. To this effect, he must have a competent survey team to carry out this work.
- .2 At the start of the work, the Contractor verifies the reference points established by the Department to ensure the reliability of the surveys to be carried out during construction.
- .3 The Contractor is required to supplement the general staking with additional staking. This entails the transfer of all points necessary for construction to the field, to allow an easy and quick check.
 - .1 The surveyor must do the research and recover the official Provincial and Federal geodesic landmarks and implant all permanent and temporary geodesic landmarks into the site and ensure compliance during all the work.
 - .2 The stakes and markers established by the Contractor shall make possible the verification of the positioning of the structure by the Government Representative before the Contractor start construction.

- .3 The stakes and markers must include implantation and the identification of stations and wall section on all the construction length on panels of minimum dimension 300 mm x 200 mm.

1.4 SURVEY REQUIREMENTS

- .1 Establish two (1) permanent grading markers on site, referenced to established bench marks by survey control points. Record locations data in Project Record Documents .
- .2 Avoid use the existing landmark on the tipped wall because these are not representative of the existing data.
- .3 Contractor must install the stake chain every five (5) metres minimum, unless a curve is present in which case the Contractor must then install the stakes every one (1) meter minimum.
- .4 Establish lines and levels, locate, and lay out, by instrumentation.
- .5 Stake for grading, fill and topsoil placement and landscaping features.
- .6 Stake embankments.

1.5 EXISTING SERVICES

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

1.6 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses. Submit log in EXCEL and PDF format no later than forty-eight (48) hours after each survey.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit all required documents in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Submit certificate **signed by surveyor** certifying and noting elevations and locations of completed Work.

1.8 SUBSURFACE CONDITIONS

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

**EXAMINATION AND
PREPARATION**

- .2 After prompt investigation, should the Parks Canada Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 19 – Waste Management and Disposal.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Canada Parks or other Contractors.
- .2 Remove waste materials from site. Do not burn waste materials on site.
- .3 Carry out snow removal and snow storage operations when required, in locations previously approved by APC.
- .4 Clear snow and ice from access to building. Bank/pile snow in designated areas only or remove from site. It is also prohibited to throw snow removed during snow removal into the historical canal, as indicated in the Historic Canals Regulations.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Store volatile waste in covered metal containers and remove from premises at end of each working day.

1.3 FINAL CLEANING

- .1 At the completion of work, remove surplus materials, tools, and construction equipment and materials that are no longer required to perform the remaining work.
- .2 Remove debris and waste materials in the works area and leave areas clean and ready to occupy.
- .3 Prior to final inspection, remove surplus materials, tools, equipment and construction materials.
- .4 Make the necessary arrangements and obtain permits from authorities having jurisdiction to dispose of debris and waste materials.
- .5 Sweep and clean sidewalks, steps and other exterior surfaces; sweep or rake the rest of the site.
- .6 Remove dirt and other debris from exterior surfaces.
- .7 Clean and sweep roofs and gutters.
- .8 Sweep and clean hard surfaces.
- .9 Clean roofs, downspouts, drains and outlets.
- .10 Remove snow and ice from access roads to the building.

CLEANING

- 1.4 WASTE MANAGEMENT AND DISPOSAL**
- .1 Separate waste materials for reuse and recycling.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill.

1.2 RELATED REQUIREMENTS

- .1 Section 01 52 00 – Construction Facilities
- .2 Section 01 74 11 – Cleaning

1.3 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .13 Toxic: Poisonous to humans either immediately or after a long period of exposure.

- .14 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .15 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings;
 - .2 Wood preservatives; strippers and household cleaners;
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .16 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting before starting any Work of the Contract attended by the Contractor, affected Subcontractors and the Canada Parks Representative to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials.
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

PART 2 EXECUTION

2.1 CWM PLAN IMPLEMENTATION

- .1 **Manager:** The Contractor is responsible for designating an onsite party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 **Distribution:** Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Canada Parks Representative, Stantec Consulting Ltd. and other site personnel as required to maintain CWM Plan.
- .3 **Instruction:** Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractors at appropriate stages of the project.
- .4 **Separation Facilities:** Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 **Progressive Documentation:** Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
 - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Canada Parks Representative, the Contractor and Stantec Consulting Ltd.
 - .2 Monthly waste summary shall contain the following information:
 - .1 The amount in tonnes or m³ and location of material landfilled;
 - .2 The amount in tonnes or m³ and location of materials diverted from landfill;
 - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

2.2 SUBCONTRACTORS' RESPONSIBILITY

- .1 The Subcontractors shall cooperate fully with the Contractor to implement the CWM Plan.
- .2 Failure to cooperate may result in the Canada Parks Representative not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor.

END OF SECTION

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1.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 – Cleaning
- .2 Section 01 74 19 – Waste Management and Disposal

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify the Canada Parks Representative in writing of satisfactory completion of the Contractor's inspection.
 - .2 Request the Canada Parks Representative's inspection.
 - .2 Canada Parks Representative's Inspection:
 - .1 The Canada Parks Representative and the Contractor shall inspect Work and identify defects and deficiencies.
 - .2 The Contractor shall correct Work as directed.
 - .3 Completion Tasks: submit written certificates in French that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by the Canada Parks Representative and the Contractor.
 - .2 When Work is incomplete according to the Canada Parks Representative, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

CLOSEOUT SUBMITTALS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 77 00 – Closeout procedures.

1.2 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one (1) week prior to contract completion with Contractor's representative and the Parks Canada Representative, in accordance with Section 01 31 19 – *Project Meetings*.
 - .2 The Parks Canada Representative shall establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 When requested, provide documents confirming the type, supplier, and quality of the products installed.
- .3 Provide “As built” plans indicating the intervention zones, the modifications from the “For construction” plans and the approved final profiles.

1.5 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.

CLOSEOUT SUBMITTALS

- .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems and process flow under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in .dwg format on CD.

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission;
 - .2 Name, addresses, and telephone numbers of Government Representative and Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – *Quality Control*.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, at site for Parks Canada Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.

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CLOSEOUT SUBMITTALS

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

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, provided by the Parks Canada Representative.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .3 Field changes of dimension and detail.
 - .4 Changes made by change orders.
 - .5 Details not on original Contract Drawings.
 - .6 References to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain field test records, required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

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CLOSEOUT SUBMITTALS

1.9 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 – *Examination and Preparation*, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, for the Parks Canada Representative's approval.
- .3 Warranty management plan to include required actions and documents to assure that the Parks Canada Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to the Parks Canada Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Nine (9) months after the date of Substantial Completion of the Work, perform a warranty inspection with the Parks Canada Representative.
- .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers, or suppliers involved.
 - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:

CLOSEOUT SUBMITTALS

- .1 Name of item, material, system or batch.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names, and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
- .3 Contractor's plans for attendance at 9-month post-construction warranty inspections.
 - .4 Procedure and status of tagging of equipment covered by extended warranties.
 - .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
 - .11 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Parks Canada Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

CLOSEOUT SUBMITTALS

END OF SECTION

CIVIL SECTIONS

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 11 – Excavation and Backfilling - Underground Services

1.2 SCOPE OF WORK

- .1 Ensure the supervision of work and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to : site preparation, excavation, backfilling with appropriate granular material, and compacting of surfaces as specified for the preparation of various infrastructures for drainage (syphons, spillways, ditch, etc.), pavement, concrete curbs, grassing, etc.

1.3 REGULATIONS

- .1 Provide shoring and bracing of excavations, protect slopes and embankments, and carry out all work in compliance with the strictest prevailing provincial and municipal regulations.

1.4 TESTS AND INSPECTIONS

- .1 Tests on materials and backfill compaction measurements shall be carried out by a Laboratory designated by the Canada Parks Representative.
- .2 No later than one week before the filling or backfilling, provide the designated Laboratory with a 25 kg sample of the fill material proposed for the execution of the work.
- .3 Do not start filling or backfilling work until the Canada Parks Representative has approved the material proposed for the execution of the work.
- .4 No later than 48 hours before the start of filling or backfilling work using approved materials, notify the Canada Parks Representative of the upcoming execution of this work, so that the designated organization can carry out compaction tests.

1.5 UNDERGROUND UTILITY NETWORKS

- .1 Before starting the work, determine the location of all underground utility lines located on or near the worksite.
- .2 If need be, arrange with the proper authorities to move underground utility lines that interfere with the execution of the work, and assume the cost of this move.

1.6 PROTECTION

- .1 Protect excavations against frost.
- .2 Keep excavations clean, free of stagnant water and loose materials.
- .3 When the soil's volume can vary significantly due to fluctuations in moisture content, cover and protect it to the satisfaction of the Canada Parks Representative.
- .4 Protect elements, both natural and man-made, that must remain intact. Unless otherwise indicated or unless they are located in the work zone, protect trees from damage.
- .5 Protect all utility lines that must remain in place.

1.7 SITE PREPARATION

- .1 Site preparation work consists in, but is not limited to, supplying the materials and manpower required to carry out excavation work, according to good engineering practices, up to the infrastructure line of the various surface restorations, including :
 - .1 Saw cuts, pavement removal, and demolition of the concrete,
 - .2 The loading, transportation and disposal of excavation surplus to a site complying with the directives of the MELCC's Soil - Protection and Contaminated Sites Rehabilitation Policy,
 - .3 This work must be carried out in compliance with the requirements of Section 31 23 11 - Civil - Excavation and Backfilling - Underground Services.

1.8 EARTHWORK AND LEVELING

- .1 Earthwork and levelling consist in, but are not limited to, supplying the materials and manpower required to carry out, according to good engineering practices, earthwork and levelling of the site in compliance with the plans' specifications, including:
 - .1 The loading, transportation and disposal of excavation surplus to a site complying with the directives of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .2 The supply and placement of backfill materials approved by the Canada Parks Representative.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIAL

- .1 Backfill materials must be approved by the Canada Parks Representative prior to their use and must comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.2 SOURCE OF MATERIALS

- .1 The Contractor must provide the address of the supplier of the backfill materials.

PART 3 - EXECUTION

3.1 EXCAVATION

- .1 For slabs and other paved surfaces, dig to the level of the infrastructure. Remove topsoil, organic materials, debris and other loose or harmful materials encountered at this level.

3.2 BACKFILLING

- .1 Carry out backfilling work in compliance with the strictest specifications in Section 31 23 11 - Excavation and Backfilling - Underground Services and the following specifications:
 - .1 Each layer of backfill shall be compacted separately to the required density. Materials must be poured onto the backfill platform and pushed forward by bulldozers. It is forbidden to unload transportation vehicles along an embankment and to allow materials to roll down a slope,
 - .2 All embankment materials must be deposited and spread over the full width required by the embankment's theoretical slope, in even layers with a maximum 300 mm thickness after compaction. The diameter of the gravel shall not exceed 2/3 of the thickness of the layer, except in the case of the final 300 mm layer beneath the infrastructure line, where the stone's size must be less than 100 mm,

3.3 LEVELING WORK

- .1 Carry out levelling work ensuring that water does not run towards the buildings, walls and paved surfaces, but that it is directed towards catch basins and other evacuation structures approved by the Canada Parks Representative. Level the ground, giving it a progressive slope between various points indicated on the drawings.

- .2 Except where otherwise indicated, the ratio of embankment slopes shall not be less than 1 V : 3 H.

3.4 FILL OR SURPLUS MATERIALS

- .1 Supply all fill materials other than approved and reusable surplus excavation material required for the execution of backfilling and levelling work, taking into account admissible tolerances, plus or minus, for general earthwork.
- .2 Earthwork and levelling work include the loading, transportation and disposal of surplus materials off-site to a location complying with the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy, and are carried out at the Contractor's expense.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

1. Section 31 23 11 – Excavation and Backfilling - Underground Services
2. Section 33 31 00 – Sanitary and Storm Sewers

1.2 EXTENT OF WORK

1. Supervise work and provide all labour, equipment, tools, materials, transportation and other services required to execute and complete all work described and specified in the present section and in the contract documents, including but not limited to: providing, laying and compacting aggregates necessary for the construction of one or more aggregate base courses and the supply and laying of one or more layers of asphalt concrete mixed in a central plant and laid over an aggregate surface, in all cases in compliance with the lines, thicknesses, levels and profiles indicated on the contract drawings or as specified by the Canada Parks Representative.

1.3 REFERENCES

1. Bureau de normalisation du Québec (B.N.Q. – Quebec standards office) (latest edition).
 - .1 NQ 2501-255 : Sols - Détermination de la relation teneur en eau-masse volumique - Essai avec énergie de compactage modifiée (2 700 kN.m/m³). [Soils – Determination of wet density – test with modified compacting energy]
2. Ministère des Transports du Québec (Quebec transportation department, hereafter MTQ) (latest edition)
 - .1 Cahier des charges et devis généraux du Ministère des Transports du Québec, latest edition. [General specifications]
 - .1 Section 13 - Revêtement de chaussée en enrobé. [Pavement with asphalt mixes]
 - .2 Cahiers des Normes, Ouvrages Routiers, vol. I “Conception routière”, most recent edition. [Road construction standards – design]
 - .3 Cahiers des Normes, Ouvrages Routiers, vol. VII “Matériaux”, most recent edition. [Road construction standards – materials]
 - .1 Standard 2101 - Granulats. [Aggregates]

- .2 Standard 2102 - Matériaux granulaires pour fondation, sous-fondation, couche de roulement granulaire et accotement. [Aggregates for base course, subbase, aggregate surface course and shoulder]
- .3 Standard 4101 - Bitumes. [Asphalts]
- .4 Standard 4105 - Émulsions de bitume. [Bituminous emulsions]
- .5 Standard 4201 - Enrobés à chaud formulés selon le principe de la méthode Marshall. [Hot mix asphalts mixed using Marshall method principles]
- .6 Standard 10201 - Peinture alkyde pour le marquage des routes. [Alkyd paint for road markings]
- .7 Standard 13101 - Géotextiles. [Geotextiles]
- .8 Standard 14601 - Microbilles de verre pour peinture servant au marquage des routes. [Glass micro-beads for road-marking paint]

1.4 WORK PERFORMED BY OTHER COMPANIES OR CONTRACTORS

1. Where applicable, the Contractor must coordinate its work with that of any other Contractor, company or public utility that needs to perform work of any nature whatsoever, before or during the period of work covered by the present contract.

1.5 INSPECTION AND TESTING

1. Analyses and tests of materials and compacting work are to be done by a testing Laboratory designated by the Canada Parks Representative.
2. The Canada Parks Agency shall pay said Laboratory's inspection and testing fees. If any tests must be repeated due to the discovery of non-conformities, the tests must be repeated at the Contractor's expense.
3. Granulometric analysis: fill materials are tested to determine if they are suitable for their intended use and compliant with specifications.
4. Wet density analysis: tests are performed on the compacted material in accordance with standard NQ 2501-255 Sols - Détermination de la relation teneur en eau-masse volumique - Essai avec énergie de compactage modifiée (2 700 kN.m/m³). [Soils – Determination of wet density – test with modified compacting energy]
5. Compaction tests.

- .1 The Canada Parks Representative reserves the right to have compaction tests performed in order to verify that specified compactness has been reached. The Contractor shall assist in the performance of such tests and may not claim compensation for work stoppages or other losses of time resulting from performance of such tests.
6. The frequency of tests is defined by the Canada Parks Representative.
7. The same Laboratory shall provide the Canada Parks Representative with progressive reports confirming that it has performed all tests ordered and that the test results are consistent with the plans and specifications. In addition, the Laboratory must provide the Canada Parks Representative with a final report confirming that all fill material is consistent with the plans and specifications and that no laying of concrete or pavement was authorized before delivery of the report.
8. If the Contractor uses a fill material other than that sampled for testing, all fill material must be removed and replaced at the Contractor's expense.

1.6 LABORATORY

1. At the Canada Parks Representative's request, a Laboratory will be present on-site to perform qualitative tests on materials and to monitor their placing.
 - .1 In situ density tests and other qualitative tests
 - .1 In the case of in situ density tests and other qualitative tests performed to verify the compaction of the infrastructure or of aggregate fills, the cost of the first test performed for acceptance of a layer of material in a given zone shall be covered by the Canada Parks Representative.
 - .2 However, if the results of such tests show the work not to be compliant with the standards listed in the specification, the Contractor must complete the repairs or take other necessary actions. Further in situ density tests shall then be at the Contractor's expense.

1.7 DOCUMENTS TO BE SUBMITTED

1. Asphalt must meet the specifications of ministry of transport of Quebec (MTQ) standard 4101. Asphalt shall be sampled at the production facility before work commences.
2. Submit test results and the certificate issued by the manufacturer attesting that the bituminous binder to be used meets the requirements of the present section.
3. Submit to the Canada Parks Representative for approval the proportioning formula for the asphalt concrete mix together with test results for the mix, at least two (2) weeks before the beginning of work.

1.8 DELIVERY TICKETS

1. Each load delivered to the site shall be accompanied by a delivery ticket in duplicate. The Canada Parks Representative's must sign one copy as a receipt for the Contractor and keep the other copy.

1.9 PAVED ROAD

1. Work involving paved roads involves, without being limited to, providing the materials and labour required to complete, in a manner consistent with industry standards, the construction of a road, including:
 - .1 Excavation to the subgrade line,
 - .2 The loading, transportation and disposal of excavation waste in a site compliant with the stipulations of the Soil protection and rehabilitation of contaminated sites of the MELCC policy,
 - .3 Supply and placing of fill material approved by the Canada Parks Representative,
 - .4 Supply and installation of geotextile membrane,
 - .5 Supply and laying of subbase and base course as specified in the plans and specifications,
 - .6 Adjustment and levelling of framework and covers of valve boxes and cleaning of said structures,
 - .7 Supply and laying of layers of asphalt coating, base and surface courses, as specified in the plans and specifications,
 - .8 Supply and application of the tack coat.

1.10 ROAD MARKINGS

1. Road-marking work involves, without being limited to, providing the materials and labour required to complete, in a manner consistent with industry standards, marking of the road as specified in the plans and specifications, including:
 - .1 Supply and application of paint and reflective glass micro beads in compliance with the marking plans, and all related work including cleaning of surfaces prior to marking, if necessary.

1.11 GEOTEXTILES

1. Geotextile work comprises the supply of all materials, labour and equipment required for the installation of geotextile membranes, and also includes any loss of material for overlapping during installation of the membrane; in other words, the Contractor is paid by the theoretical square metre of surface to be covered by the geotextile membrane.

PART 2 - PRODUCTS

2.1 GOTEXTILE MEMBRANE

1. Geotextile membranes installed in the infrastructure must be Type III and meet the requirements of ministry of transport of Quebec MTQ standard 13101.

2.2 AGGREGATES FOR SUBBASE AND BASE COURSE

1. Aggregates used for the subbase and base course must meet the requirements of MTQ (ministry of transport of quebec) standards 2101 and 2102 and those of Section 31 23 11 – Excavation and Backfilling - Underground Services.

2.3 ASPHALT MIXES – HOT PREPARATION AND LAYING

1. Definitions
 - .1 Asphalt mixes: An asphalt mix prepared and laid hot is a combination of new aggregates and bitumen, mixed hot in a mixing plant and designed to be laid while hot.
 - .2 Internal quality control: Quality control done by the Contractor responsible for supplying asphalt mixes.
 - .3 External quality control: Quality control done by an organization independent of the Contractor and paid by the Canada Parks Agency.
 - .4 Internal control tracking: Tracking of the Contractor's internal control results by the external control process.
 - .5 Process audits: Within a specific project, documented audit of the asphalt mix production process and of the implementation of quality management activities described in the Contractor's quality manual and in the quality plan and the control and testing plan.
 - .6 ISO 9002: Standard that defines minimum requirements for a quality system.

- .7 Reclaimed asphalt pavement: Asphalt that has been reclaimed either by milling or by in situ pulverization.
- 2. Reference standards
 - .1 Hot mix asphalts must be compliant with the requirements indicated in the plans and specifications and with applicable standards from the ministry of transport of quebec MTQ's standard for road construction and maintenance (vol. VII - Matériaux des normes de constructions et d'entretien routiers). The applicable edition is the most recent as of the signing of the contract documents. The standards are:
 - .1 Standard 2101: Granulats [Aggregates]
 - .2 Standard 4101: Bitume [Asphalts]
 - .3 Standard 4201: Enrobés à chaud formulés selon le principe de la méthode Marshall [Hot mix asphalts formulated using the Marshall method]
 - .4 Standard 4202: Enrobés à chaud formulés selon la méthode de formulation du Laboratoire de chaussées [Hot mix asphalts formulated using the Laboratoire des chaussées (Quebec pavement laboratory) method]

2.4 CONSTITUENTS OF ASPHALT MIXES

- 1. Asphalt
 - .1 Specifications
 - .1 The required characteristics and evaluation criteria for asphalts are found in MINISTRY OF TRANSPORT OF QUEBEC MTQ standard 4101.
 - .2 The performance class of asphalts is defined by the expression PG H L, i.e.:
 - .1 PG: Performance Grade;
 - .2 H: temperature (in °C) above which the asphalt is likely to experience irreversible deformations;
 - .3 L: temperature (in °C) below which the asphalt is likely to crack due to thermal contraction.
 - .3 The performance class to be used is indicated in the specification. Class PG 58-28 is generally used for pavement designed for local traffic with no bus traffic when specified; in other cases class PG 64-34 is used for the surface course when specified.

.2 Quality assurance

- .1 All asphalt used for producing asphalt mixes must be produced by a Producer holding an ISO 9002 compliant quality certification (Quality system - model for quality assurance in production, installation and servicing).
- .2 For each delivery of asphalt, the asphalt-mix Producer must obtain a certification of compliance from the asphalt Producer containing the following information:
 - .1 General information:
 - .1 Identification of the Producer and place of production;
 - .2 Performance class of the asphalt;
 - .3 The lot number;
 - .4 Production date.
 - .2 Characterization tests:
 - .1 Date of asphalt characterization;
 - .2 All tests in table 4101-1 of standard 4101.
 - .3 Control tests:
 - .1 Date of test;
 - .2 DSR (AASHTO TP 5) tests on the source asphalt:
 - .1 The high characterization temperature (Te)
 - .3 BBR (AASHTO TP 1) tests on the source asphalt:
 - .1 Stiffness value - So;
 - .2 Slope value mo.
 - .4 Recommendations – service temperatures
 - .1 Minimum and maximum storage temperatures;
 - .2 Minimum and maximum mixing temperatures (1);

(1) *A range of 14 °C is allowed for mixing. The interval is determined by applying a tolerance of ± 7 °C to the optimal mixing temperature corresponding to a viscosity of 0.17 Pa-s. This temperature is determined using the ministry of transport of quebec MTQ's LC 25-007 testing method. In the event that this calculation yields a maximum mixing temperature above 170 °C, the maximum mixing temperature is set at 170 °C and the minimum at 156 °C.*

2. Aggregates

- .1 Aggregates used for preparation of asphalt mixes must be compliant with the requirements of ministry of transport of quebec MTQ standard 2101.
- .2 For asphalt mixes formulated according to the Marshall method, aggregates must additionally meet the requirements of ministry of transport of quebec MTQ standard 4201. However, the polishing-by-projection coefficient requirement (LC-21-102) does not apply.
- .3 For asphalt mixes developed using the Laboratoire des chaussées method, aggregates must additionally meet the requirements of ministry of transport of quebec MTQ standard 4202.
- .4 Intrinsic and manufacturing characteristics are indicated in the contract documents. If omitted from these documents, the following characteristics apply:

TABLE - AGGREGATES

TYPE OF PAVEMENT	AGGREGATE SIZE	INTRINSIC CHARACTERISTICS CATÉGORIE	MANUFACTURING CHARACTERISTICS CATEGORY
Local traffic, no buses	Coarse	2	A
	Fine	2	
All others	Coarse	2	A
	Fine	1	100 % fractured

- .5 Unless otherwise specified in the contract documents, fine aggregates must consist of manufactured sand or a combination of natural and manufactured sand, and coarse aggregates must be crushed quarried rock.

3. Hot mix asphalt

- .1 Hot mix asphalts must be produced in compliance with ministry of transport of quebec MTQ standards 4201 and 4202. The asphalt mixes must be produced by a firm operating

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a mixing plant registered by a registrar accredited by the Standards Council of Canada or a recognized certifying body attesting that the Producer has a quality system compliant with ISO 9002 “Quality system - model for quality assurance in production, installation and servicing.”

- .2 Reclaimed asphalt concrete, coarse and fine aggregates containing scoria and/or blast furnace residues must not be used in any asphalt mix.
4. Resistance to rutting
 - .1 Requirements for rutting resistance of asphalt mixes as presented in tables 4201-1 and 4202-1 of ministry of transport of quebec MTQ standards 4201 and 4202 apply when the asphalt used is performance grade PG 64-34.
5. Presentation of formulas
 - .1 The theoretical formula for the hot mix asphalt must be signed and dated by the Producer’s quality control manager and supplied at least one week before delivery. One theoretical formula per type of asphalt mix must be produced for each type of binder or each change in aggregate supply. The characteristics given in the formula must be representative of the hot mix asphalt to be placed and compliant with the requirements of the applicable standard, specifically ministry of transport of quebec MTQ 4201 for hot mix asphalts formulated using the Marshall method and MTQ 4202 for hot mix asphalts formulated using the ministry of transport of quebec MTQ Laboratoire des chaussées method. The percentage of air voids in the mix to be produced from a formula must be 3 to 4 %.
 - .2 Each year, when starting up production, the Producer must perform an in-process evaluation of the formula as presented. The evaluation of the asphalt mix formula is made from the results of tests done by the Producer on five samples drawn from a representative production run. Two reference samples must be taken at the time of in-process testing, and the Producer must advise the Canada Parks Representative of the date and place of the sampling, to which the Canada Parks Representative may send a representative. The list of tests required for evaluation of the formula is presented in Appendix 1.
 - .3 If results of the reference test are compliant with the requirements of the present specification, the final formula is accepted as submitted or with minor modifications.
 - .1 Lots
 - .1 Rulings as to compliance or non-compliance shall apply to the lot as a whole.
 - .2 Work is subdivided into lots of 1 000 tonnes. Work involving total quantities smaller than a lot shall be considered to constitute one lot.

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- .3 For work involving more than one lot, the quantity in tonnes exceeding a lot or a round number of lots, is considered to constitute a lot if equal to or greater than 100 tonnes. Otherwise, it is considered to be part of the final complete lot.
 - .4 A lot means the production of a single type of mix in the same plant, for a specific project involving the Canada Parks Representative and under the same contract.
 - .5 Sampling of the asphalt mix must be done on the jobsite or in the plant by the Laboratory using a random numbers table and at the frequency of one sample per 200 tonnes of asphalt mix. Sampling is to be done according to the LC 26-005 testing method and compliance testing is to be done at the Producer's expense. The sample is divided into two portions. One portion is used for internal control tests, while the other is set aside for external control tests. In case of quantities inferior to 600 tonnes of mix, a minimum of 3 samples is collected.
 - .6 The name of the quality representative and that of the sampling supervisor must be submitted to the Canada Parks Representative for approval before the start of work. For each day of production, test results by sample and the external control samples must be submitted to the Laboratory engaged by the Canada Parks Representative not later than two business days after the placement of the asphalt mix. For a lot, the report must be submitted to the laboratory not more than 1 week after completion of production of the lot. The required tests are listed in Appendix 1.
6. Compliance
- .1 Main characteristics
 - .1 In addition to meeting the requirements of the present specification, a lot is considered compliant following external control testing if, for the main characteristics, the deviation between the average results obtained for samples taken from the lot and the formula is within acceptable deviations (Et) indicated in the following table:

TABLE – MAIN CHARACTERISTICS

ACCEPTABLE AND CRITICAL DEVIATIONS FROM THE FORMULA

Main characteristic	Et for N = 1	Et for N = 2	Et for N = 3	Et for N = 4	Et for N = 5
% passing through the 80 µm screen					
- All mixes	1,7	1,2	1,0	0,9	0,8
Granulometric total					
- EB-20, EB-14, ESG-14	40	30	24	21	19
- EB-10S, EB-10C, ESG-10, EG-10	30	22	18	16	14
Bitumen content					
- All mixes	0,45	0,38	0,31	0,27	0,24
Compactness					
- EB-20	4,0	1,6	1,2	1,1	0,8
- EB-14, ESG-14, EB-10S, EB-10C, ESG-10, EG-10	4,0	1,6	1,4	1,3	1,0

* N = Number of samples

Note 1 For compactness, acceptable and critical deviations are applied to the minimum requirement of 92 %.

Note 2 Acceptable and critical deviations apply to the mean value for the lot as compared to the formula.

Note 3 The values of the deviations indicated are expressed as percentages.

.2 Percentage air void

.1 A lot will be considered compliant if the percentage of air voids as established by standard LC 26-320 deviates less than 1,5 % from the final asphalt mix formula.

.3 Correction factor

.1 No correction factor will be applied. If a batch does not respect the tolerable variations, it will be rejected. The Contractor will have to remove, to his own expenses, all the bituminous mix constituting this batch if this one is already set up and to carry out again paving work in order to respect the allowed variations.

.4 Other characteristics

.1 Hot mix asphalt formulated using the ministry of transport of quebec MTQ Laboratory method

.1 For hot mix asphalt formulated using the Laboratory method (MTQ standard 4202) to be compliant, it must also meet the following criteria:

.1 In results of analysis for the first screen, in which retained material is permitted, the percentage of material passing through the screen must not be under the minimum requirement indicated in table 4202-1 of MTQ standard 4202 by more than 3 %, and the requirement of 100 % of material passing through the next largest screen must be met as stipulated in the same table;

.2 The percentage of “Marshall” voids exceeding 1,0 % or deviating more than 1,5 % from the average % of “Marshall” voids obtained during the in-process analysis of the theoretical formulas and the establishment of final formulas must be targeted or met;

or

The percentage of voids indicated in table 4202-1 of ministry of transport of quebec MTQ standard 4202 for each number of gyrations in a gyratory shear compactor is targeted or met.

In the event that one of these criteria is not met, each sample that failed to meet one or more criteria is to be analyzed separately for compliance with the requirements of table 4201-1 of MTQ standard 4201 in order to identify the source of bias, and the Canada Parks Representative reserves the right to reject the work and have the work re-done by the Contractor.

All asphalt mixes that do not meet the requirements stated in the plans and specifications shall be deemed defective.

7. Types of asphalt mixes

.1 All asphalt mixes must resist rutting. Rutting resistance tests must be performed in compliance with ministry of transport of quebec MTQ standard 4201, in particular table 4201-1.

.2 The Contractor must supply a data sheet showing that the asphalt mixes are resistant to rutting.

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8. Acceptance inspection of pavement compactness and thickness
 - .1 This section does not apply to asphalt mixes used for patching or for correction before laying of the surface course.
 - .1 Verification of compactness using radiation-type densimeter
 - .1 The Canada Parks Representative verifies the compactness of asphalt pavement using a radiation-type densimeter.
 - .2 Calibration of densimeter
 - .1 For each mixing plant, the densimeter to be used is calibrated using the procedure defined in standard ASTM D 2950, “Standard test method for density or bituminous concrete in place by nuclear methods” or by comparison of densimeter results and core sample densities, done at least once per year per type of asphalt mix using an average of at least six core samples in order to correct the density reading obtained with the device.

2.5 TACK COAT

1. The tack coat is a fast-curing RS-1 type bituminous emulsion. The tack coat must meet the requirements of ministry of transport of quebec MTQ standard 4105. Supply of the tack coat must meet the requirements of the MTQ’s general specifications (CCDG).

2.6 PROPORTIONING FORMULA

1. The proportioning formula shall be supplied by the Contractor and approved by the Canada Parks Representative.
2. The proportioning formula must be developed by a testing Laboratory approved by the Canada Parks Representative.
3. The formula cannot be modified without the approval of the Canada Parks Representative. If the source of material changes, a new proportioning formula must be approved by the Canada Parks Representative.

2.7 LIQUID DUST-CONTROL AGENT

1. When vehicles must drive on an aggregate surface and weather conditions cause excessive dust to be raised, hindering traffic and harming the environment, the Canada Parks Representative may request that the surface be treated with a liquid dust-control agent consisting of a calcium chloride (CaCl₂) solution.

2. The agent is to be applied to a levelled, prepared surface.
3. The calcium chloride solution, which must be 35 % by weight, is applied under pressure in one or two applications at the rate of 1,0 L/m² unless otherwise indicated.
4. The aqueous calcium chloride solution must meet the requirements of standard NQ 2410-001 "Solution aqueuse de sels inorganiques utilisée comme abat-poussière" [Aqueous solution of inorganic salts used as dust-control agents].
5. The Contractor shall ensure that the specified application rate is respected. No application is to be made during rain or on an excessively damp surface.
6. If necessary, the Canada Parks Representative may verify the compliance of the product. Sampling of the material on site is done from the spreader tank according to standard ASTM-D260, and analysis of the aqueous solution is done using the Solvay 832-A method or by densimetry. The samples are used for determining the quality and concentration of CaCl₂ in the solution. Solutions must be applied using a spreader with spray bar fitted with accessories appropriate to the work such as a tachometer, pump, pressure gauge and spray bar with jets and sprinklers.
7. Application of liquid calcium chloride includes purchase, transportation, application and all other incidental expenses.

2.8 ROAD MARKINGS

1. Quality of paint
 - .1 The paint used for painting markings must meet the requirements of ministry of transport of quebec MTQ standard 10201 "Peinture alkyde pour le marquage des routes" [Alkyd paint for road markings] from the general standards (CCGD), most recent edition. The only products that will be considered are those previously approved via the most recent MTQ central laboratory call for tenders.
2. Data sheet
 - .1 At the first site meeting, the Contractor must provide the Canada Parks Representative's with the paint manufacturer's data sheets, certifying compliance of the product. The data sheet must include full identification of the product, including:
 - .1 Manufacturer's name and address;
 - .2 Name of the product;
 - .3 Product code;

- .4 The reference to ministry of transport of quebec MTQ standard 10201;
 - .5 Manufacture date;
 - .6 The colour and its code;
 - .7 The product's physical and chemical characteristics;
 - .8 Storage conditions;
 - .9 Instructions for pavement preparation;
 - .10 Methods and conditions of application specified by the manufacturer.
3. Paint manufacture date
- .1 All paint used for road markings must be from a batch produced not more than three (3) months before the date of application.
4. Safety sheet
- .1 Barrels must be labelled in compliance with standards for the identification of hazardous materials.
5. Materials
- .1 The Contractor must have at its disposal the required and appropriate materials for painting each type of line. The Canada Parks Representative reserves the right to verify equipment, tools, materials, or employees scheduled to do the work at any time before or after acceptance of the agreement and to reject any inadequate or non-compliant device and/or any vehicle in poor condition.
 - .2 Spray guns must have a minimum pressure of 550 kPa.
6. Micro beads for painting
- .1 Micro beads must meet the following standards: BNQ 3820-200 and BNQ 3702-600 "Microbilles de verre pour peinture servant au marquage des routes" and MTQ 14601, "Microbilles de verre pour peinture servant au marquage des routes" [Glass micro beads for road markings].
 - .2 Micro beads are to be used for centre lines, stop lines, crosswalks and arrows. The rate of application of glass beads shall be 0,6 to 0,7 kg/L of paint. Application of micro beads must be done mechanically and on the entire painted surface.
7. Application of paint

- .1 The Contractor shall apply the paint using a spray gun at the rate of 0,56 mm thick \pm 0,04 mm (wet film) and apply the glass micro beads on wet paint at the rate of 0,6 to 0,7 kg/L of paint. The method of micro bead application must be approved by the supervisor.
 - .2 Following application, fresh paint shall be protected by markers or cones for a minimum of one hour.
 - .3 The product must not be applied on longitudinal seams in the pavement or on crack sealant.
 - .4 The product must not be applied over existing marking materials.
 - .5 Measurement of wet film thickness of the paint for purposes of acceptance is done by the Laboratory engaged by the Canada Parks Representative in compliance with standard NQ 3700-927 (Appendix A).
8. Colour
- .1 The colour to be used for each element is indicated on the plans. All omissions or deviations must be brought to the attention of the Canada Parks Representative as soon as possible.
9. Quality of medium duration product
- .1 Paint used for medium term markings must comply with MTQ standard 10202 "Peinture alkyde pour le marquage des routes" [Alkyd paint for road markings], most recent edition. The product must be resistant to damage from contact with sodium chloride or other chemical agents used for de-icing the road and to contact with oils in paving products and motor oil.
 - .2 The product must be applied in its liquid state using a modified paint gun allowing the application of the product in a single coat 120 mm wide and 0,64 mm thick.
 - .3 In order to ensure retro-reflective performance, reflective glass micro beads shall be sprinkled on the paint immediately after application.
 - .4 Drying time must not exceed 60 minutes, after which time traffic must be allowed back on the road.

PART 3 - EXECUTION

3.1 GENERAL

1. The construction of bases and pavement shall be done after spring thaw, once the site is completely free of snow-melt runoff water. The preparation and laying of asphalt mixes must be done in favourable weather and at an ambient temperature suitable for producing a smooth surface meeting the requirements of the present specification. It is not permitted to operate when moisture in aggregates affects the temperature of the mix or the pace of operations, or when the base is soaked or covered with puddles or mud. The temperature of the surface to be paved must be at least 5 °C with an upward trend. When the surface temperature drops below 7 °C, no surface course may be laid without the Canada Parks Representative's written permission. At all times, the mix must be compacted until it reaches the specified density. No surface mix is to be laid after October 15 without the Canada Parks Representative's permission.
2. At all times, the Contractor must take the necessary steps to reduce to a minimum dust emissions caused by the work.
3. The asphalt mix is composed of coarse and fine aggregates or fine aggregates alone, evenly coated with asphalt binder in a mixing plant and at a temperature favourable for mixing and laying.

3.2 ALIGNMENTS AND LEVELS

1. All work must be done in conformity with the alignments and levels indicated in the plans and details.
2. Except as otherwise indicated on the plans, final resurfacing elevations must be the same as the elevations for connection to existing pavement.
3. If obstructions or other circumstances not foreseen on the plans disrupt the work to the point that changes are required, the Canada Parks Representative may require that work be modified or moved.

3.3 PAVEMENT REPAIR

1. When existing pavement is excavated, the Contractor fills the upper portion of excavations and repairs the joint with existing asphalt mix in the following manner:
 - .1 Make a saw cut and excavate, lay the conduit and asphalt;
 - .2 Fill with class "A" aggregate, compacted to 90 % of the modified Proctor value, in layers no thicker than 600 mm, to one (1) metre below the level of the surface course. From that level to the underside of the pavement, required compactness for crushed

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stone shall be 95 % (modified Proctor); the final layer of fill using MG-20b under the infrastructure line shall be compacted to 95 % of the modified Proctor value to a thickness of 150 mm.

- .3 Make a new saw cut in the pavement, 1 metre (min.) from each side of the original saw cut, and excavate at 45° to one (1) metre below pavement level;
 - .4 Fill with stone for the base according to specifications in a thin layer of 150 mm to the underside of the pavement and compact to a minimum of 95 % of the modified Proctor value;
 - .5 Coat the sides of the pavement with a tack coat before paving.
2. Original markings must be repainted, included in the cost of paving. After repairing the cut, seams are hot milled using the thermal regeneration method in order to melt the seams.

3.4 REPAIR OF SURFACE TO BE PAVED

1. On an aggregate base
 - .1 When the scarification and removal of part of the base course are necessary due to contamination of same owing to a delay, outside the Contractor's responsibility, between constructions of the base and covering with asphalt concrete, the Contractor shall advise the Canada Parks Representative before undertaking such operations.
 - .2 After authorization by the Canada Parks Representative, the Contractor shall proceed to the cleaning, scarification and removal of a portion of the base course, and spread additional crushed rock in order to correct the profile of the base course.
 - .3 The surface to be covered must have a slope and direction consistent with the plans, longitudinal profiles and cross sections as included in the contract, must not deviate by more than 5 mm from the theoretical profile. It must be dry, compacted as per requirements and free of foreign or loose materials.
 - .4 All manholes, valve rooms, valve boxes, and similar infrastructure are adjusted and levelled to 10 mm below the final level of the surface course, while catch basins are installed 25 mm lower than the final surface course level. The cost of such work is included in surface preparation work.
2. On an asphalt concrete surface
 - .1 When the base course of asphalt concrete is rough or irregular, a correction layer must be laid, using a leveller or mechanical spreader and compacted before the laying of subsequent courses.

- .2 Before laying the new layer, the Contractor must spread an asphalt primer.
 - .3 Depressions and irregularities are corrected locally and defective materials, ridges and surplus material accumulated in cracks, seams or elsewhere are to be removed.
 - .4 All public utilities are to be adjusted to 10 mm below the final surface level, or 25 mm in the case of catch basins.
3. Contact surface
- .1 The Contractor must apply a tack coat to every paved surface to be covered, in between each layer of hot mix asphalt, on all vertical contact surfaces and on curbs, sidewalks, gutters or other structures.
 - .2 All seams between old and new pavement must be cleaned and filled with a bituminous binder compliant with MTQ standard 4105. The approved binder must be spread in accordance with the requirements of the article titled "Tack Coat."

3.5 SUBGRADE PREPARATION

1. This section covers the work to be done to ensure that the subgrade has the shape indicated by the longitudinal sections and cross-sections before proceeding with construction of the pavement structure.
2. The Contractor must excavate and remove existing bases and pavement, sidewalks and curbs on the construction site. All materials must be disposed of off-site, as described in Section 31 23 11 - Excavation and Backfilling - Underground Services.
3. The loading, transportation and disposal of excavation waste from subgrade preparation in a site compliant with the Soil protection and rehabilitation of contaminated sites policy (MELCC) shall be done at the Contractor's expense.
4. Preparation of the roadbed where foundations for the various outdoor facilities will be built must be done in compliance with the relevant requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services and in accordance with the recommendations of the geotechnical study.
5. Subgrade preparation includes grading work necessary for creating a roadbed on which will be built the foundations of road infrastructure, consistent with the profile indicated on the plans and details. The roadbed must be profiled in a manner that permits drainage of foundations to intakes. The subgrade must be smooth and free of ruts and depressions. The layer of topsoil in the traffic lane right-of-way must be excavated.
6. The surface to be prepared must be perfectly drained beforehand and for the duration of preparation work. If there are small inequalities, deviating less than 50 mm from the required

profile, it is sufficient to level the entire surface with a grader, then to compact the surface with the appropriate tools. If the surface is rough or uneven, the Contractor must first scarify it to the level of the bottom of the depressions and recommence compacting operations.

7. If it is impossible to obtain an even, stable surface due to the presence in the subgrade of materials in poor condition, these materials must be dried by harrowing or excavated.
8. Any borrow required for filling such excavations must be of a quality acceptable to the Canada Parks Representative.
9. Before laying subbase or base course materials, the evenness of the surface is to be verified by the Canada Parks Representative. Work to install the subbase or base course may not begin before the Canada Parks Representative has accepted the subgrade.
10. Next, compact the natural soil over a thickness of at least 300 mm, such that the compactness of subgrade soil is everywhere at least 95 % of its maximum dry density as determined via the modified Proctor test.
11. All subgrade surfaces that are not accessible to heavy compacting machinery shall also be perfectly compacted, using appropriate small machinery or a vibrating plate.
12. Any soft or unstable points must be excavated and filled with more stable material with similar grain size distribution to surrounding materials.
13. At locations where the ground profile must be raised to the level of the planned subgrade, the Contractor must plan for raising with modified MG-112, in layers 300 mm thick and compacted to 95 % of maximum density as determined by the modified Proctor test.
14. After compacting and profiling the roadbed, the Contractor must, as soon as possible, begin construction of the subbase so that the subgrade is not excessively exposed to the elements and altered as a consequence.

3.6 SUBBASE

1. Generalities
 - .1 The subgrade surface must be prepared in accordance with the requirements of the articles titled "Compacting of materials" and "Subgrade preparation." The thickness of the sub foundation is determined by the tender documents. Aggregates are spread in layers of uniform thickness not to exceed 300 mm. The spreading method used must prevent all segregation of aggregates.
 - .2 Compacting is then done using the method described under "Compacting of materials." The required degree of compactness is 95 % of maximum dry density as determined by the modified Proctor test.

- .3 Before laying the subbase, the sub foundation surface must be free of ruts or other depressions and must not deviate by more than 10 mm from the levels and longitudinal and cross sections shown on the plans.
2. Construction method
 - .1 Subbases are then constructed in successive layers. Specified aggregates are spread across the entire width of the subgrade or sub foundation at a uniform thickness, without segregation, in compliance with the cross section of the planned pavement. The surface is then levelled and, if necessary, moistened or dried in order to obtain the desired compactness.
 - .2 Each layer must be compacted separately in compliance with the requirements of the section on “Compacting of materials.” The required degree of compactness is 95 % of maximum dry density as determined by the modified Proctor test. Areas that are difficult to access must be compacted manually using appropriate tampers, special compactors or vibrating plates.
 - .3 The Contractor shall also include the costs of the following procedure: laying of the subbase and base course, adjustment above public utilities to 100 mm \pm 25 mm below the level of the surface course, including the supply of adjustment rings and cleaning of manholes, valve chambers and catch basins (even if said structures were dirty at the start of work).
 3. Shaping
 - .1 Final shaping of the street must follow a slope and alignment compliant with the plans.
 4. Unstable or contaminated areas
 - .1 If weak points slump under the compactor or subgrade soil or mud mix with the subbase, such unstable or contaminated materials must be removed and those portions of the subbase shall be rebuilt after strengthening of the subgrade.
 5. Subbase cleaning
 - .1 If paving is done long after the subbase is constructed, the subbase is to be decontaminated. Such work includes the removal and transportation of materials deemed by the Canada Parks Representative to be contaminated, and the shaping and compaction of the subbase.
 6. Placing
 - .1 Place geotextile membranes after the subgrade has been inspected and approved by the Canada Parks Representative.

- .2 Place subbase materials after the subgrade has been inspected and approved by the Canada Parks Representative.
- .3 Acceptance of material and density tests are described in Section 31 23 11 - Excavation and filling - Underground Services.
- .4 At the joint between new and existing pavement structures, a transition must be made in the various foundation layers with a slope having a ratio of 1 V : 1 H.

3.7 PAVING

1. General

- .1 Materials (finishers, compactors, etc.) and the use of asphalt mixes must be compliant with the requirements (technical only) described in section 13 - Revêtement de chaussée en enrobé [asphalt road paving] of the MTQ's general specifications (latest edition).
- .2 The payment terms described in section 13 - Revêtement de chaussée en enrobé of the MTQ's general specifications (latest edition) do not apply to this project.

2. Transportation of mix

- .1 The mix must be transported to the site in sealed (boxed) vehicles. All loads must be delivered early enough to allow for spreading and rolling in daylight. It is never permitted to overheat a mix to counteract cooling caused by travel time, no matter how long the trip.

3. Adjustment of structures

- .1 All access shafts for underground structures in paved areas must be adjusted to the final level of the pavement. Access shafts on grass shall be adjusted to grass level.
- .2 Catch-basin heads and catch-basin manholes must be adjusted to 6 mm (¼ in) below the final level of the paving.
- .3 For all of the above adjustment work, the Contractor must supply and install all levelling rings, extensions or other accessories required for completing the work to industry standards and to the Canada Parks Representative's satisfaction.

4. Asphalt covering

- .1 Each course of asphalt mix must have a uniform texture, free of segregation or bleeding, be regular and compliant with the profiles specified on the contract drawings. Cross sections and longitudinal sections of the paved surface must allow for water runoff to catch basins, with no accumulations of standing water. After the final compacting of

each course, the Canada Parks Representative will verify the alignment and slope. The profile of each course must not deviate by more than 6 mm (¼ in) per 3 m (10 ft) from the profile specified on the contract drawings. The thickness of each course must not deviate by more than 6 mm (¼ in) from the specified thickness.

- .2 Run-off slopes on hard surfaces must not have a grade less than 1%, unless otherwise indicated.
5. Tack coats
- .1 The Contractor must apply a tack coat to surfaces to be paved, in the form of an RS-1 type emulsion in compliance with the MTQ's general specifications (most recent edition). On horizontal surfaces, the tack coat is applied uniformly using a spray bar under pressure.
 - .1 At the residual rate of 0,5 L/m² for binders on aggregate surfaces (when required);
 - .2 At the residual rate of 0,25 L/m² for the tack coat on a paved, planed or newly paved surface.
 - .2 Likewise, the Contractor must brush with the same binder contact surfaces between concrete curbs and sidewalks, catch basins, manholes, valve boxes, access and/or utility shafts, etc.
 - .3 The Contractor shall take all necessary precautions to ensure that a tack coat does not spill onto already paved adjacent surfaces or surfaces that are not going to be covered with asphalt.
 - .4 While the binder is curing, vehicle traffic must be detoured or controlled.
 - .5 It is forbidden to apply binders during rain or on wet or frozen surfaces or when, unless recommended by the manufacturer, the ambient air temperature is below 10 °C.
 - .6 A surface to which a tack coat has been applied must be covered with the new asphalt course the same day if the road is open to traffic overnight.
 - .7 All transverse joints and longitudinal seams must be brushed with an even coat of binder at the rate of 0,4 L/m².
 - .8 Cutback is not to be used for tack coats.
6. Application of asphalt mix
- .1 Mechanical

- .1 Comply with the technical requirements of section 13 - Revêtement de chaussée en enrobé of the MTQ's general specifications (most recent edition).
 - .2 When mixing and aeration of the asphalt mix are complete, use the paving machine to spread the mix to the desired elevations.
 - .3 All surface, base and subbase courses are to be spread mechanically using a self-propelled paving machine driven by a competent operator. Adjustments to the subgrader, tampers, distributor screws, etc. are to be verified regularly to ensure that the mix has a uniform texture devoid of tearing, deformations or grooves. The operating mode (stop time, speed, etc.) of a paving machine must be such as to allow the laying of a course with the correct density and other characteristics. All asphalt mixes whose composition or temperature is non compliant must be rejected.
- .2 Joints and seams
- .1 Longitudinal seams must be parallel to the alignment lines. The paving machine must travel on a line parallel to the centre of the road. When two paving machines are working in echelon, the first follows the line and the second follows the edge of the strip of asphalt laid by the first. In order to achieve a hot, easily compacted seam, the two pavers are to drive as close to one another as possible and in no case separated by more than 75 m. When a single paving machine is used, the mix is laid in alternation on either side of the road in strips not exceeding 200 m in length in warm weather and 50 m in cold weather. The Canada Parks Representative may make an exception to this rule and indicate a more suitable sequence considering the thickness of the mix, the temperature and the hourly production of the central plant. Whenever possible, the laying of asphalt at the end of the day is to be organized so as to avoid leaving any longitudinal seams to be completed the next day. Joints between new and old pavement and between pavements laid on consecutive days are to be made with care in order to produce a perfectly continuous connection. In order to obtain well-made transverse joints, the edge of the previously laid course must be cut to the full depth, brushed with an even coat of emulsion and heated so as to make a heat seal.
- .3 Irregularities
- .1 Immediately after laying a course and before rolling, the surface is verified and any irregularities remedied. Accumulations of materials due to the grader are removed with a shovel or hoe. Scalloping or other depressions are filled with hot mix and levelled. It is strictly forbidden in such cases to throw the mix in a manner that causes it to fan out.
- .4 Manual spreading

- .1 In locations that the paving machine cannot reach, hot mix is spread manually. This must be done carefully. The mix is applied evenly and spread in a loose layer of uniform density using rakes or hoes, taking care to avoid segregation. Before rolling, take care to check the surface with a rule and remedy any irregularities. Areas surrounding structures and covers and hard-to-access locations must be compacted with a hot iron.

- .5 Cleaning of manual tools
 - .1 When manual tools are cleaned by flame, take care not to heat them to temperatures hot enough to burn the mix. When manual tools are cleaned with oil, the oil container is to be placed in a location where it cannot contaminate the mix.

- 7. Compacting
 - .1 Generalities
 - .1 The instructions in the following articles are applicable to all pavement courses.
 - .2 Rolling must begin as soon as the mix is strong enough to support the roller without significant deformation.
 - .3 For initial rolling, use multiple-tire rollers. Rolling is completed with a steel roller that must produce a smooth, even surface compliant with the elevations indicated on the plans.
 - .2 Number of rollers
 - .1 The minimum number of rollers is two (2). However, the actual required number is that which makes it possible to create an asphalt coating whose surface course and density meet specifications.
 - .2 Rolling must be completed before sunset. An exception may be made to this rule if the Canada Parks Representative deems that satisfactory precautions are being taken.
 - .3 Rolling sequence
 - .1 The rolling sequence must be such that the asphalt coating has a surface course and compactness that meet specifications and that transverse joints and longitudinal seams are completely waterproof and are practically identical to the rest of the surface.
 - .4 Temperature control

- .1 Storage temperature and central plant mixing temperature of the asphalt must be less than or equal to the maximum temperatures indicated on the asphalt's certificate of compliance.
- .2 The decline in temperature of an asphalt mix between mixing and laying on the site must not exceed 15 °C.
- .3 All mixes that fail to meet these requirements shall be rejected.
- .4 Traffic must not be allowed to use freshly laid asphalt until the temperature of the surface has cooled to less than 50 °C.
- .5 Checking compactness
 - .1 Rolling is to continue until the mix reaches the required density.
 - .2 The Contractor is free to check the compactness of each layer using the method of its choice. Compactness must be between 92 % and 98 % of that indicated by standard LC 26-320.
 - .3 All layers of asphalt must be compacted to at least 92 % of the maximum density indicated by standard LC 26-320.
8. Quality and evenness of asphalt
 - .1 The surface of each layer (surface course, binder, base) must have a uniform texture, free of segregation, and be regular and compliant with prescribed alignments and slopes.
 - .2 After final rolling of each course, the Canada Parks Representative verifies alignments and slopes. The profile of each course must not deviate from the prescribed profile by more than 6 mm. All irregularities or depressions greater than 5 mm per 3 m on surface courses or 6 mm per 3 m on other courses must be corrected.
 - .3 Verification of irregularities is done using a 3 m straight edge fitted with a level, which the Contractor must have at its disposal on the site at all times.
 - .4 Any defective section must be replaced or remedied to the Canada Parks Representative's satisfaction before the Canada Parks Representative will allow another course to be laid or accept the completed work. The mix used for correcting depressions must be such that the nominal diameter of the largest particle is smaller than the mean depth of the depression.
9. Lot

- .1 For purposes of compactness control and work acceptance or rejection, and for the application of correction factors to unit prices submitted, lots are subdivided into lots of 1,000 tonnes each on the same basis as the physical characteristics of mixes.
10. Determination of compactness
 - .1 The compactness percentage is determined by the gross density of the mix (specific gravity measured by radiation-type densimeter divided by the specific gravity of water at 25 °C, i.e. 997,044 kg/m³) divided by the maximum average density on that day as measured during receiving inspection of the asphalt mix, multiplied by 100.
 11. Acceptance of a lot
 - .1 A lot is accepted when the average of compactness results is within the limits accepted.
 - .2 If the average compactness value does not meet requirements, the Canada Parks Representative shall advise the Contractor in writing, indicating that a reevaluation of compactness by collecting specimens via core sampling shall be done as described in the following section.
 12. Reevaluation of compactness by testing of core samples
 - .1 The Canada Parks Representative sets a date for the reevaluation of compactness using one (1) core sample for every 200 tonnes of asphalt mixes laid. The sampling points are to be determined randomly. Samples must be collected within 20 days following sending of notice to the Contractor.
 - .2 The compactness percentage of the pavement is the ratio of the gross density of the core sample drawn from the road to the maximum average density measured on the day as measured during the receiving inspection, multiplied by 100.
 - .3 Tests for gross density of the samples are to be done in the laboratory mandated by the Canada Parks Representative using Ministry of Transports of Quebec MTQ testing method LC 26-040.
 - .4 The Contractor may assign an observer during sample collection and testing; any remarks on a procedure deemed faulty must be signed immediately, and any divergences must be brought to the Canada Parks Representative's attention.
 - .5 If the average of the compactness measurements of the core samples does not fall within the boundaries indicated on Table 1 (article 5.19.05.01), the correction factor given in article 5.19.05.03 shall apply.
 - .6 The costs of such reevaluation shall be borne by the Canada Parks Agency.
 13. Cleaning of manholes, valve chambers, catch basins, sidewalks and curbs

- .1 Immediately after laying a course of asphalt mix, the Contractor must clean manholes, catch basins and valve chambers of all debris that accumulated during the work or that was present at the beginning of the work. Covers must be cleaned and sidewalks must be free of all asphalt primer stains.

3.8 DAMAGE TO EXISTING PAVEMENT

When working on existing pavement, the Contractor shall saw, using an appropriate tool, each side of the area to be excavated along straight lines with a minimum length of 6 m and use a loader with tires to avoid damaging pavement that is to be kept; use of a tracked loader on existing pavement is prohibited at all times. If the Contractor neglects to meet this requirement, the Canada Parks Representative may require the Contractor to repair the pavement over the entire width of the street, at the Contractor's expense. The Contractor shall also take all necessary precautions to protect existing infrastructures including, but not limited to, sidewalks and curbs, and is responsible for all damage to existing infrastructure and must make all repairs deemed necessary, at its own expense.

1. The Contractor is to fill the upper portion of excavated areas and repair joints with existing pavement in the following manner:
 - .1 Make a saw cut, excavate, lay the conduit and its casing;
 - .2 Fill with class "A" aggregate, compacted to 90 % of the modified Proctor value, in layers not to exceed 600 mm, to one (1) metre below pavement level. From this level to a level just below pavement level, the required compactness for crushed stone shall be 95 % (modified Proctor); the final layer of fill under the infrastructure line, in MG-20b material, shall be compacted to 95 % (modified Proctor) over a thickness of 150 mm;
 - .3 Make a new saw cut in the pavement, at 1 m (min.) from each side of the original saw cut and excavate at 45° to one (1) metre under pavement level;
 - .4 Fill with stone for the foundation according to specifications, in a thin layer of 150 mm to the underside of the pavement and compact to a minimum of 95 % of the modified Proctor value;
 - .5 Apply a tack coat to the sides of the pavement before paving;
2. Original markings must be repainted and included in the paving work. After repairing the cut, seams are hot milled using the thermal regeneration method in order to melt the seams.

3.9 CONTROL

1. Notify the Canada Parks Representative and the Laboratory at least 24 hours before laying any asphalt mix.

2. While asphalt mix is being laid, a representative of the Laboratory must collect samples and be present for the work. Tests must be done by the Laboratory designated by the Canada Parks Representative. The cost of these tests and supervision shall be borne by the Canada Parks Agency.
3. Every layer of asphalt mix must be compacted to 92 % of the maximum density as specified in standard LC 26-320.
4. All asphalt mixes must be resistant to rutting. Rutting resistance tests must be performed in compliance with Ministry of Transports of Quebec MTQ standard 4201, in particular table 4201-1.
5. The Contractor must supply a data sheet demonstrating that asphalt mixes are resistant to rutting.

3.10 WASTE MATERIAL

1. Waste material shall be disposed of in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.11 SAMPLING SEQUENCE FOR ASPHALT MIXES

1. Generalities
 - .1 Tests required for each analysis type are presented in tables below:
2. Production-reference
 - .1 For the asphalt mixes in Tableau 4201-1, a type C analysis is required on each of five production reference samples. Type E analysis must also be performed on one of the five samples.
 - .2 For the asphalt mixes in Tableau 4202-1, a type B analysis is required for each of the five production reference samples. Type E and type D analysis must also be performed on one of the five samples.
3. In production
 - .1 For each lot, the following analyses are required:

TABLE - TYPES OF ANALYSIS REQUIRED FOR EACH SAMPLE

NUMBER OF LOT SAMPLE	REFERENCE STANDARD	
	4201	4202
1	B	B + D

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3	B	B
All other samples	A	A

TABLE – LIST OF TESTS REQUIRED FOR EACH ANALYSIS TYPE

DESCRIPTION	STANDARD	ANALYSIS TYPE				
		A	B	C	D	E
Granulometric analysis	LC 26-360	x	x	x		
Determination of filler mass in excavated material	LC 26-110	x	x	x		
Determination of bitumen content	LC 26-100	x	x	x		
Determination of maximum density	LC 26-045	x	x	x		
Determination of percentage of air voids and compactness in compacted hot mix asphalts	LC 26-320		x	x		
“Marshall” method for determining sample resistance to deformation				x		
Determination of compactability of hot mix asphalts using gyratory shear press	LC 26-003				x	
Water content	LC 26-001					x
Resistance to rutting (Note 1)						x

Note 1: The rutting test is required when the asphalt used is performance class PG 64-34; for other performance classes the test is required when stipulated in the contract documents.

3.12 ROAD MARKINGS

1. General

- .1 The location of the work is indicated on the plans provided with the proposal. The Contractor shall perform the marking work in compliance with the standardized plans and following the details shown on the Canada Parks Representative’s sample plates and those appearing on the proposal plans or in accordance with the Canada Parks Representative’s instructions.
- .2 Pavement markings have the following colour and width:
 - .1 Lines marking parking spaces : 125 mm (5 in), White
- .3 Marking of parking spaces for handicapped persons must comply with the standards of MTQ volumes I and IV.
- .4 All materials such as paint, thinner, micro beads and other equipment, tools and labour for performing the work are supplied and paid by the Contractor.

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2. Conditions for applying paint
 - .1 One of the quality criteria for ensuring high-performance markings is the controlled application of paint:
 - .1 Paint must be applied on clean, dry surfaces.
 - .2 Places susceptible to accumulations of foreign matter such as rocks, soil, oil, etc. must be completely cleaned before painting. Mechanical street sweepers are recommended for this work.
 - .3 To achieve uniform, satisfactory results, the speed of the painting truck must not exceed 20 km/h.
 - .2 Paint must not be applied to the pavement in the following conditions:
 - .1 Wet pavement.
 - .2 There is a risk of the paint being exposed to rain before a reasonable drying time has elapsed.
 - .3 The air temperature is below 16 °C (60 °F) or above 32 °C (90 °F).
 - .4 Relative humidity is above 85 %.
 - .5 The pavement is covered with soil, debris or other dirt that can impede painting.
 - .3 The Contractor is not to use any thinner to accelerate drying or for any other reason.
3. Application of markings in parking lots
 - .1 Premarking must be done with white and yellow depending on line position, and must be masked as well as possible by the final painting.
 - .2 Only centre lines and pedestrian and school crosswalk lines not at intersections are painted yellow unless otherwise indicated in the marking plans.
 - .3 The proportioning characteristics of the paint and micro beads are the following:
 - .1 Rate of application for unbroken line: 75 L/km (27.5 gal (UK)/mi),
 - .2 Thickness of line: 0,60 mm (0.024 in) (fresh paint), tolerance 10 %,
 - .3 Kilograms of micro beads per litre of paint: 0,60 kg/L (6 lb/gal (UK)) minimum, tolerance 10 %,

- .4 Concerning the application of micro beads, it is imperative that they be applied uniformly over the entire marked surface in order to provide maximum effectiveness.
- .4 Cones must not be removed before the paint is dry. The Contractor must install the cones no more than 15 m (50 ft) apart. The cones must be 450 mm (18 in) high and class II as described in the BNQ traffic cones standard (“Cônes de signalisation”), NQ 1941-501.
- .5 The Contractor is responsible for removing by abrasion any paint spread by vehicles contacting the paint before drying, spilled by accident on the pavement or used for applying markings due to Contractor error.
- .6 Corrections must be made by abrasion assisted by specialized material, and not through the use of neutralizing paint, and there must be no visible paint marks after removal work.
- .7 All errors on the part of the Contractor must be rectified within seventy-two (72) hours or less.
- .8 Where indicated on the plans, the Contractor must remove existing painted markings. To do this, the Contractor must remove the markings using specialized machinery and not through the use of neutralizing paint.

3.13 MARKING SUPERVISION

1. Quality control
 - .1 At least twice per day, the Contractor must test the thickness of the wet paint film and measure the width of markings. Thickness measurement shall be done with an interchemical thickness gage before the application of glass micro beads.
 - .2 The Contractor must test the thickness of the paint film and the width of the lines. Thickness is measured using an interchemical thickness gage.
 - .3 A copy of the thickness tests must be submitted to the Canada Parks Representative, who may perform certain tests including a thickness test without prior notice to the Contractor and with the Contractor’s cooperation.
 - .4 All non-compliant work shall be re-done at the Contractor’s expense.
 - .5 The disposal of waste material will be done in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.
2. Laboratory tests

- .1 Samples may be collected by the Laboratory in order to check the compliance of materials used. If a sample tests non-compliant, all of the remaining product shall be replaced and the Contractor shall reimburse the Canada Parks Agency for all testing and control costs.
- .2 Sampling of the product is done by the Laboratory during execution of the work. The Contractor shall cooperate with Laboratory personnel in facilitating sampling of the product.
- .3 If the paint is found to be non-compliant, the Canada Parks Representative may call a halt to the work. The Contractor shall then be required to prove the compliance of the product it wishes to use before being authorized to continue the work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 32 92 23 –Sodding

1.2 SCOPE OF WORK

- .1 Ensure supervision of the work and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to: the excavation and backfilling of specified areas and the application of topsoil in preparation for sodding work.

1.3 REFERENCES

- .1 Bureau de normalisation du Québec (B.N.Q.) latest edition.
 - .1 NQ 0605-100 (latest edition) : Landscaping using vegetation.

1.4 ELEMENTS TO BE SUBMITTED

- .1 Advise the Canada Parks Representative of the proposed source of topsoil and provide access allowing said representative to conduct the analysis of materials. The acceptance of the topsoil will depend on the results of soil analyses and the inspection, Work shall not start until the topsoil has been approved by the Canada Parks Representative.
- .2 Topsoil tests and analyses shall be carried out by a laboratory with the Canada Parks Representative assuming the cost of these.
- .3 Analyze the topsoil prior to stripping and stockpiling to determine its contents of clay, sand, mud, phosphorous, potassium (NPK), magnesium (Mg), soluble salts, growth inhibitors, and soil sterilizers as well as its pH.
- .4 Provide the Canada Parks Representative with a copy of the soil analysis report as well as recommended soil improvements.

1.5 WORK SCHEDULE

- .1 Topsoil shall be spread and finish earthwork carried out at the appropriate time for undertaking sodding work under the best possible conditions, within ten (10) days following the end of the initial spreading work.

1.6 TOPSOIL AND FINISH EARTHWORK

- .1 Topsoil and finish earthwork consist in, but are not limited to, supplying the materials and manpower required to carry out the spreading of topsoil and finish earthwork, according to good engineering practices, including:
 - .1 The supply and application of topsoil to a minimum thickness of 150 mm,
 - .2 Topsoil mixes including granulometry and specified amendments,
 - .3 Finish earthwork,
 - .4 Finish levelling according to specified tolerances,
 - .5 The cleaning and off-site disposal of non-reusable materials at a location complying with the directives of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

PART 2 - PRODUCTS

2.1 SOIL IMPROVEMENT MATERIALS

- .1 Fertilizer: commercial, synthetic, granular with a fast-acting source of phosphorous, containing no more than 35 % soluble nitrogen.
- .2 Composition for sodding : 10-25-10 fertilizer.
- .3 Compost : commercial AA or B-type screened commercial mix whose components have fully decomposed.
- .4 Ground agricultural lime with a carbonate content of at least 85 %.
- .5 Granulometric requirements: passing percentage by weight: 90 % passing through a sieve with openings of 1 mm; 50 % passing through a sieve with openings of 125 µm.
- .6 Using the quantity of lime needed, as determined by the soil analysis, to obtain the required degree of acidity (pH).

- .7 Bone meal: raw or steamed bone meal, finely ground, containing at least 3 % nitrogen and 20 % phosphoric acid.
- .8 Coarse sand: hard, granular sand, complying with the CSA A62-56-M1976 standard, well cleaned and free of any impurities, chemical product or organic matter.

2.2 MIX OF SCREENED TOPSOIL

- .1 Mix for areas to be sodded and seeded:
 - .1 Two parts loam,
 - .2 One part black soil,
 - .3 One part coarse sand,
 - .4 3 % to 7 % organic matter.

2.3 CHARACTERISTICS OF MIXES

- .1 The cation exchange capacity (C.E.C.) must be between 10 and 20.
- .2 The chemical verification of the soil shall be carried out using the “Walkey Black” oxidation method.
- .3 The acidity level (pH) must be 6.5.
- .4 Include the following chemical element in the proportions shown:

Chemical elements	Proportion
Phosphorus (P)	100 ppm
Potassium (K)	125 ppm
Magnesium (Mg)	200 ppm
Calcium (Ca)	2 000 ppm

- .5 Fall within the following grading range:

Screen	Passing %
10 mm	100
5 mm	98 to 100
1,25 mm	90 to 97

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630 µm	65 to 90
315 µm	25 to 65
160 µm	15 to 25
80 µm	5 to 15

- .6 Water retention capacity: maximum 20 %.

PART 3 - EXECUTION

3.1 PREPARATION OF EXISTING AREA

- .1 Level the ground, filling dips and creating a slope favoring the flow of water. Remove soil that has been contaminated by toxic materials, remove debris as instructed by the Canada Parks Representative.
- .2 Loosen to a depth of 100 mm the entire area covered by the foundation layer to be covered in topsoil, Repeat the operation wherever the transportation material and spreading of the soil have compacted said foundation layer.
- .3 Clear the surface of debris, roots, vegetation branches and stones more than 50 mm in diameter.

3.2 SPREADING OF THE TOPSOIL

- .1 Have the Canada Parks Representative inspect and approve the condition of the foundation layer before starting to spread the topsoil.
- .2 Where planting and seeding work is to be carried out (as specified by the Canada Parks Representative and the plans), spread the topsoil on the approved and non-frozen foundation layer in even layers containing an adequate amount of water.
- .3 Spread the topsoil according to instructions, to a thickness of at least 150 mm on the areas to be sodded.
- .4 Where slabs of sod are to be laid, spread the topsail leaving a thickness of 15 mm for the surface layer.
- .5 Manually spread topsoil around places where it is hard to use motorized equipment
- .6 Take into account 25 % settling of soil volume when placing the soil, to comply with projected levels.

3.3 SOIL IMPROVEMENT MATERIALS

- .1 Incorporate soil improvement materials in prescribed quantities based on the results of soil sample analyses.
- .2 Ensure the penetration of the compost and soil improvement materials into the full thickness of the topsoil layer before incorporating the fertilizer.

3.4 SPREADING OF THE FERTILIZER

- .1 Spread the fertilizer at least one week after the application of lime.
- .2 Spread the fertilizer evenly over the entire surface of the topsoil, in quantities based on results of sample analyses.
- .3 Ensure the penetration of the fertilizer into the entire topsoil layer.

3.5 FINISH EARTHWORK

- .1 Level and move the soil so as to eliminate any irregularities and dips, ensuring the flow of surface water. Apply a layer of loosened loam, breaking it up and raking it.
- .2 Use a 50 kg roller measuring at least 900 mm wide to firm up the layer of topsoil over which the sod is to be laid, making it smoother, more even, with a fine, loose texture, to the satisfaction of the Canada Parks Representative.

3.6 RESTORATION OF STOCKPILING AREAS

- .1 Restore the condition of the stockpiling areas used for the work, to the satisfaction of the Canada Parks Representative.

3.7 SURPLUS MATERIALS

- .1 Excavation surplus refused by the Canada Parks Representative for the project's backfilling purposes (except for contaminated materials, demolition materials and special waste) must be disposed off-site.
- .2 All of the aforementioned disposal work must be carried out in compliance with the MELCC's Directives and/or Regulations which, in the event of discrepancy with the above, will prevail over the preceding requirements.

END OF SECTION

Rev. 00: Issued for tender (2020-07-15)

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 32 91 21 –Topsoil and Finish Earthwork

1.2 SCOPE OF WORK

- .1 The Contractor shall assume, in compliance with plans and other documents, the supervision of work, and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to: covering the specified surfaces with a permanent lawn.

1.3 REFERENCES

- .1 Bureau de normalisation du Québec (B.N.Q) latest edition.
 - .1 NQ 0605-100 : Aménagement paysager à l'aide de végétaux [Landscaping using vegetation].
 - .2 NQ 0605-300 : Produits de pépinières et de gazon [Nursery and lawn products].
 - .3 NQ 0640-0640-050 : Gazon en plaques - Classification et caractéristiques [Grass sod - Classification and characteristics].

1.4 ELEMENTS TO BE SUBMITTED

- .1 Cultivated sod must be approved at the supply source by the Canada Parks Representative.
- .2 Once the sod source has been approved, no other source shall be used without written authorization.
- .3 Submit a sample of each type of grass sod.
- .4 Samples must be approved by the Canada Parks Representative before work is undertaken.

1.5 CALENDAR

- .1 The installation of grass sod must coincide with the spreading of topsoil.

1.6 SODDING A LAWN

- .1 Work related to sodding consists in, but is not limited to, supplying the materials and manpower required for installing a lawn on the specified areas, in compliance with good engineering practices, including:
 - .1 Supplying the manpower, equipment and materials for the excavation and repair of surfaces,
 - .2 Supplying and applying topsoil,
 - .3 Supplying and spreading fertilizer,
 - .4 Supplying and installing sod slabs or rolls,
 - .5 Controlling weeds,
 - .6 Anchoring using stakes,
 - .7 Ensuring maintenance during the installation and warranty period,
 - .8 Disposing of non-reusable materials on a site complying with the directions of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 No. 1 cultivated sod: the quantity of sod and the source of supply must comply with standards described in section 17 of the "Guide Specifications for Nursery Stock", latest edition, published by the Canadian Nursery Landscape Association.
 - .1 No. 1 Kentucky bluegrass: cultivated sod grown from a mix of at least 3 varieties. The sod will be delivered in slabs or large rolls, depending on contract specifications.
 - .2 Broken, dried, or yellowed slabs will be refused by the Canada Parks Representative.
 - .3 Quality of cultivated sod:
 - .1 Grass containing no more than 2 dicotyledon seeds (broadleaf weeds) or 10 other seeds per 40 m² area,
 - .2 Grass whose density is such that no soil remains visible from a height of 1 500 mm, after mowing to a height of 40 mm,

- .3 Maximum mowed height: 35 mm to 65 mm,
 - .4 Thickness of the sod slabs' soil: 6 mm to 15 mm,
 - .5 Characteristics of the sod slabs' soil: sandy. Any other type of supporting soil will be refused.
- .2 Seeding of indigenous meadow (20.00% flowers and 80.00% grass)
 - .1 100% Indigenous mixture including 9 flowers and 1 grass of meadow.
 - .2 Height at maturity: 45 cm
 - .3 Average height: 30 to 45 cm
 - .4 Add annual Ray-grass as a shelter plant to help reduce the appearance of weeds.
 - .3 Water: potable.
 - .4 Fertilizer: 1-2, 5-1 granular fertilizer.
 - .5 Herbicide: the type, rate and application method are subject to the approval of the Canada Parks Representative.
 - .6 No pesticides should be used near water (within 3 meters of the high-water mark). If pesticides are required elsewhere on the work site, the pesticide treatment plan must be submitted for approval by Parks Canada Representative.

PART 3 - EXECUTION

3.1 PREPARATION WORK

- .1 Ensure that the soil's relief is adequate and that areas to be sodded are prepared as prescribed in Section 32 91 21 - Topsoil and Finish Earthwork. Notify the Canada Parks Representative of any discrepancy with the drawings and wait for instructions from the Canada Parks Representative before starting the work.
- .2 Carry out levelling for the finish earthwork to create a gentle, even slope, free of dips and mounds, within 10 mm, in keeping with the required contours and levels, to favor natural surface drainage.
- .3 Before undertaking the installation of the sod, have the level and thickness of the topsoil approved by the Canada Parks Representative.

3.2 INSTALLATION OF THE SOD

- .1 Sod slabs must be installed within 36 hours of the time they have been harvested.
- .2 The sod must have a minimum thickness of 40 mm and be moist enough to withstand transportation. It must be loaded and unloaded by hand and installed without delay. A chemical fertilizer is used.
- .3 It is forbidden to install slabs of sod when the ground is excessively wet, when temperatures are below the freezing point, or on frozen soil. Slabs of sod must be dense, green, of even composition, and virtually weed-free. Slabs must be of a uniform thickness and the part of the slab consisting of soil must not be thicker than 15 mm. Grass that allows the soil to be visible when it is mowed to a height of 40 mm will not be accepted.
- .4 The Contractor shall spread evenly, over the entire area to be sodded, a fertilizer applied according to the Manufacturer's instructions, mixing it well with the layer of topsoil.
- .5 Install the slabs of sod in parallel lines perpendicular to the slope, flush with adjacent surfaces and with staggered joints. Move the slabs as close together as possible without overlapping. Using a sharp knife, cut out asymmetrical or overly thin slabs. In embankments, position slabs starting at the bottom of the embankment, and secure them using small stakes. Use a sufficient number of anchoring stakes on slopes whose ratio is below 1 V : 3 H.
- .6 If required, place the stakes as follows:
 - .1 At 200 mm centre-to-centre, 100 mm from the top edge of the first slabs covering the slope.
 - .2 Use at least 3 to 6 stakes per square meter.
 - .3 Use at least 6 to 9 stakes per square meter, in surface water; modify the placement of the stakes as directed by the Canada Parks Representative.
 - .4 Plant the stakes so that they protrude from the surface of the soil by 20 mm.
 - .5 Using a light roller, press the slabs of sod into the soil to ensure good soil to sod contact. It is forbidden to use a heavy roller to correct surface irregularities.
- .7 In the water stream, slabs are laid transversely to the direction of the flow, with joints made outside the water.
- .8 The sod is rolled using a lawn roller weighing no more than 30 kg and must be watered well until the provisional acceptance of the work by the Canada Parks Representative.
- .9 Once the sod has been laid, it must be watered sufficiently to allow the moisture to seep into the sod and soil to a depth of 150 mm.

3.3 PLANTING

- .1 For bare-rooted plants, place a 50 mm layer of fill at the bottom of the hole.
- .2 For plants with tontine clod, remove the upper third (1/3) of the burlap, paying attention not to damage the clod.
 - .1 Do not remove the canvas or the rope which is under the root ball.
- .3 For plants in containers or whose root ball is wrapped with a non-degradable material, completely remove the container or envelope without damaging the root ball.
- .4 Plant plants vertically where indicated.
 - .1 Orient them so that they produce the best possible effect, taking into consideration neighboring works such as buildings, roads and sidewalks.
- .5 For vegetal ground cover, also backfill to the final level and pack the soil to eliminate air pockets.
- .6 Water plants well.
- .7 After soil compaction, backfill to final level.

3.4 PROTECTION OF SODDED AREAS

- .1 Protect sodded areas using fencing if necessary.

3.5 MAINTENANCE DURING THE ROOTING PERIOD

- .1 Maintain sodded areas from the start of the work until its provisional acceptance.
- .2 Water the grass as much and as often as needed to ensure that the layer of soil directly below the grass is always moist to a depth of 75 mm to 100 mm.
- .3 Mow the grass, the first time, to a height of 40 mm when it has reached a height of 60 mm. Remove grass clippings likely to choke the grass. Mow the grass until provisional acceptance, maintaining a mowed height of 40 mm to 60 mm.
- .4 Maintain sodded areas, keeping them 100 % weed-free. Comply with prevailing municipal by-laws on the use of pesticides. If necessary, use a mechanical process.
- .5 Spread a nitrogen-rich natural fertilizer once sodding work has been completed. Spread the fertilizer evenly over the sodded area at a rate of 0,5 kg per 100 m² and water well to foster penetration. Re-apply approximately one month after completion of the work.

- .6 Postpone fertilization to the following spring if the work must be carried out within four weeks of the end of the growth season.

3.6 ACCEPTANCE OF WORK

- .1 Sodded areas will be accepted at the time of inspection, provided that:
 - .1 The grass is growing well and the sod has taken root.
 - .2 The grass is free of weeds and bare areas.
 - .3 The soil is not visible from a height of 1 500 mm when the grass has been mowed to a height of 40 mm.
 - .4 The grass has been mowed at least twice.
- .2 Areas sodded in the fall will be approved the following spring, one month after the start of the growing season, provided conditions for acceptance have been met.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 11 –Excavation and Backfilling - Underground Services
- .2 Section 32 11 00 –Roadworks

1.2 SCOPE OF WORK

- .1 Ensure the supervision of the work and provide all the manpower, equipment, tools, materials, transportation and other services required to carry out and complete all work described and specified in this section and Contract documents, including but not limited to: the dismantlement of existing sewer networks including underground structures, the supply and installation of pipes, connectors and accessories, manholes, catch basin manholes, catch basins, service connections, joints, connections to existing pipes or manholes, trench maintenance, dewatering of excavations, trench filling, watertightness tests, etc.

1.3 REFERENCES

- .1 Bureau de normalisation du Québec (B.N.Q. – Quebec Standards Bureau) (latest edition).
 - .1 BNQ 1809-300: Construction Work – General technical clauses – Drinking water and sewer pipes.
 - .2 NQ 2622-126: Pipes and monolithic lateral connections made of reinforced and non-reinforced concrete for the evacuation of sanitary and storm sewers.
 - .3 NQ 2622-420: Sewer manhole, catch basins and manifold chambers of prefabricated reinforced cement concrete.
 - .4 NQ 3221-500: Frames, gratings, manhole covers, catch basins and valve boxes – cast of grey or ductile cast iron for civil engineering works - Characteristics and test methods.
- .2 National Plumbing Code of Canada (latest edition).

1.4 DEFINITIONS

- .1 Accessories: devices and apparatus other than the sewer pipe, which are used along with the sewer. This includes connectors such as tees, crosses, elbows and stoppers.
- .2 Backfilling: operation consisting in filling the trench with foundation, cover and fill materials.

- .3 Gasket: a rubber ring, which provides a watertight joint for connectors, pipes and couplings, etc.
- .4 Manhole: a specially built opening, usually in the upper part of a sewer, chamber or other infrastructure, for maintenance or other purposes.
- .5 Service connection: pipe draining sanitary or storm water from the property line to the main sanitary or sewer pipe respectively.

1.5 SAMPLES

- .1 Present samples for testing purposes to the Canada Parks Representative at the latter's request, and at the Contractor's expense.

1.6 SHOP DRAWINGS

- .1 Shop drawings are required but are not necessarily limited to the following:
 - .1 Connectors (tees, elbows, couplings),
 - .2 Rubber joint gaskets,
 - .3 Sewer pipes,
 - .4 Frames, covers and gratings.
 - .5 Adjustment units,
 - .6 Manholes,
 - .7 Catch basins,
 - .8 Catch basin manholes,
 - .9 Culverts and accessories,
 - .10 Flow regulator,
 - .11 Geotextile membranes,
 - .12 Overflow chamber,
 - .13 Check valve,
 - .14 Safety stop.

- .15 Rehabilitation lining of culverts
- .2 Work related to the drawings may only start after said drawings have been revised by the Canada Parks Representative.
- .3 The Contractor shall present an exhaustive list of the materials to be used, including the name of the manufacturer and supplier.
- .4 Within the limits of the Contract, all materials must be uniform and come from the same manufacturer.

1.7 CERTIFICATION OF MATERIALS

- .1 At least 2 weeks prior to the start of the work, present the results of tests conducted by the manufacturer and the certificate attesting that the pipes, manholes, catch basin manholes and catch basins comply with the requirements of this section.
- .2 Ensure that pipes bear the certification stamp.

1.8 TRANSPORTATION, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in compliance with the manufacturer's instructions.
- .2 The Contractor shall take the following precautions when handling pipes:
 - .1 The pipe shall be handled so as not to touch sharp objects.
 - .2 Avoid impact in lifting.
 - .3 Storage surfaces shall be flat and clean.
 - .4 Pipes shall not be dropped or allowed to knock against another pipe.
 - .5 Gaskets shall be protected from excessive exposure to heat, direct sunlight, oil and grease.
- .3 All materials found to be damaged or in poor condition shall be rejected or replaced at the Contractor's expense.

1.9 WORK SCHEDULE

- .1 Prepare the work schedule so as to minimize interruptions to existing services and maintain a normal flow rate during construction work.

- .2 Provide the Canada Parks Representative with the schedule of projected interruptions for approval, and comply with this duly approved schedule.
- .3 When service interruptions are required, inform the Canada Parks Representative and Authorities involved at least 48 hours in advance.

1.10 WORK BY OTHER COMPANIES OR CONTRACTORS

- .1 If need be, the Contractor shall be required to coordinate his work with that of the Municipality or any other contractor, company or public utility, which may need to carry out work of any nature whatsoever, before or during the execution of work covered by this contract.

1.11 ALIGNMENT AND LEVELS

- .1 The Contractor shall strictly respect the layout and profile of the sewer (or sewers) called for in the contract drawings, as well as the class and diameter of pipes, the number, positions and elevations of the manholes, catch basin manholes, and catch basins.
- .2 The final location of an underground structure must not be more than 100 mm (4 in.) from that shown in the contract drawings. The final elevation of an underground structure must not be more than 25 mm (1 in.) from that indicated on these same drawings.
- .3 In the event that obstructions not covered by the drawings interfere with work to the point of requiring changes to the plans, the Canada Parks Representative can require that work be modified or displaced accordingly, or he can make the necessary arrangements with the owners of said obstructions for their demolition, displacement, or reconstruction.
- .4 The Contractor shall take necessary precautions during excavation work, to locate known or unknown underground structures, and shall be responsible for their repair should they be damaged as a result of his negligence.

1.12 REMOVAL OF SEWER PIPES

- .1 Work related to the removal of sewer sections consists in, but is not limited to, the supply of materials and labour required for the removal, according to good engineering practices, of sections shown in the plans and specifications, including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

- .4 The dewatering of trenches and diversion of water in the pipes,
 - .5 The complete removal of existing sewer pipes, as well as their transportation to the site designated by Owner authorities,
 - .6 The sealing of pipe extremities,
 - .7 The supply and application of lean concrete,
 - .8 The protection and repair of public utilities,
 - .9 Backfilling and placement of approved material up to the infrastructure,
 - .10 The restoration of sub-bases and pavement.
- .2 The Contractor shall carry out work to seal the openings of connectors in compliance with the BNQ 1809-300/ standard.

1.13 MANHOLE TO BE REMOVED

- .1 Work related to the removal of the manhole consists in, but is not limited to, the supply of materials and labour needed for the removal, according to good engineering practices, of existing manholes shown in the plans and specifications, including:
- .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .4 The dewatering of trenches and diversion of water in the pipes,
 - .5 The complete removal of the manhole,
 - .6 The sealing of the extremities of pipes in place,
 - .7 The protection and repair of public utilities,
 - .8 Backfilling and placement of approved material up to the infrastructure,
 - .9 The restoration of sub-bases and pavement.
- .2 The Contractor shall carry out work to seal the opening of connectors in keeping with the BNQ 1809-300 standard.

1.14 INSTALLATION OF SEWER PIPES AND CULVERTS

- .1 Work related to sewer pipes consists in, but is not limited to, the supply of materials and labour needed to carry out, according to good engineering practices, the installation of sewer pipes, in keeping with the diameters and materials specified in the plans, including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .4 Supply and installation of pipes,
 - .5 The dewatering of trenches and diversion of water in the pipes,
 - .6 Supply and installation of the base course and cover,
 - .7 Supply and installation of sewer pipes,
 - .8 Accessories,
 - .9 Backfilling and placement of approved material as far as the infrastructure,
 - .10 Distortion tests (PVC pipe) as well as infiltration and watertightness tests (sanitary sewer pipe) and CCTV inspection (sanitary sewer pipe and storm sewer pipe),
 - .11 Repairs to existing pavement, curbs and sidewalks,
 - .12 Protection and repair of public utilities and all other work required for the full use of these structures.

1.15 INSTALLATION OF PREFABRICATED MANHOLES AND CATCH BASIN MANHOLES

- .1 Work related to prefabricated manholes consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of new sewer manholes and catch basic manholes, including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,

- .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
- .4 The supply of manholes as specified in the plans,
- .5 The dewatering of excavations,
- .6 The supply and installation of the base course,
- .7 Accessories, gutters,
- .8 The connection of pipes to the manhole,
- .9 The supply and installation of the machined frames and covers,
- .10 In-depth cleaning of the manhole,
- .11 Backfilling and placement of approved material as far as the infrastructure,
- .12 Watertightness tests,
- .13 Repairs to existing pavement, curbs and sidewalks,
- .14 Protection and repair of public utilities.

1.16 INSTALLATION OF CATCH BASINS

- .1 Work related to catch basins consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of catch basins including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .4 The supply of catch basins as specified in the plans,
 - .5 The dewatering of trenches,
 - .6 The supply and installation of the base course,

- .7 Connection of the catch basins to the network,
- .8 Accessories,
- .9 In-depth cleaning of the catch basin,
- .10 Backfilling and placement of approved material as far as the infrastructure,
- .11 Infiltration tests and CCTV inspection,
- .12 Repairs to existing pavement, curbs and sidewalks,
- .13 Protection and repair of public utilities.

1.17 CATCH BASINS TO BE REMOVED

- .1 Work related to the removal of catch basins consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the removal of the catch basin including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .4 Sealing of the connection point to the water main,
 - .5 The dewatering of trenches,
 - .6 Backfilling and placement of approved material up to the infrastructure,
 - .7 Repairs to existing pavement, curbs and sidewalks,
 - .8 Protection and repair of public utilities.
- .2 The Contractor shall carry out work to seal the opening of connectors in keeping with the BNQ 1809-300 standard.

1.18 UNDERGROUND RETENTION POND

- .1 The underground retention pond must meet the characteristics, requirements and details presented on the project plans. The retention volume must be equivalent to the one specified on the plans.

1.19 CONNECTION TO AN EXISTING PIPE

- .1 Work related to connections to an existing pipe consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the connection to an existing pipe, including:
 - .1 Saw cuts,
 - .2 Removal of the pavement and infrastructure,
 - .3 Loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,
 - .4 Clearing of the existing structure,
 - .5 Cleaning of pipes and joints,
 - .6 Production of the watertight connection joint,
 - .7 Connection in compliance with the BNQ 1809-300 standard,
 - .8 The supply and installation of the base course and surround,
 - .9 Accessories,
 - .10 Backfilling and placement of approved material up to the infrastructure.

1.20 STOPPERS OR GRATINGS

- .1 Work related to stoppers or gratings consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of stoppers and gratings, including:
 - .1 The supply and installation of stoppers or gratings as per instructions provided in the plans.

PART 2 - PRODUCTS

2.1 PIPES OR CULVERTS

- .1 Reinforced concrete pipes:
 - .1 Unless otherwise stipulated in the plans, storm sewer pipes are made of Class IV reinforced concrete and galvanized steel. The concrete shall be sound, free of chips and flaws, and pipes shall be of regular shape. Joints shall have rubber gaskets complying with the requirements of the NQ 2622-126 or ASTM C443M standard. When required, the lubricant shall comply with the recommendations of the pipes' supplier.
 - .2 For the design of syphon 1 and the culvert downstream of syphon 1, the Contractor shall submit a structural design for a lifetime of 100 years by an engineer member of the IOQ for the required reinforcement and concrete according to loads, site conditions and end use (take into account the thickness and nature of the backfill, maximum water height, boats, etc.
 - .3 Pipes shall bear the manufacturer's name or trademark, production date, and class of pipe as well as their BNQ number.
 - .4 Prior to the start of the work, the Contractor shall make known the name of the manufacturer of the pipes he intends to use, and which must hold a BNQ certificate for the diameter and class of pipe supplied.
 - .5 The Contractor shall be particularly careful when handling and unloading the pipes, as well as lowering them into the trench to avoid cracking, chipping or breaking them. Any pipe that is damaged in any way whatsoever will be refused by the Canada Parks Representative and the Contractor shall be required to replace them, whether or not they have been incorporated into the structures.
 - .6 The Canada Parks Representative reserves the right to require that reinforced concrete pipes be checked for their resistance to collapsing under outside loads. These tests shall be carried out in compliance with the method and requirements of NQ 2622-126 standards. These tests shall be entrusted to a Laboratory selected by the Contractor and approved by the Canada Parks Representative. Laboratory reports shall be sent to the Canada Parks Representative at least three (3) days prior to the installation of pipes.
 - .7 A standard part of each diameter and from each manufacturer shall be tested in this manner, for each 500 m (1,640 ft.) of pipe to be installed. However, the Canada Parks Representative reserves the right to require that a larger number of samples be tested, should he deem it necessary.

- .8 All costs incurred for these tests, except for Laboratory tests, shall be the responsibility of the Contractor, including the supply of samples, their transportation to the Laboratory and all related expenses.
- .9 For each delivery, the Contractor shall provide the Canada Parks Representative with an attestation of compliance. The attestation of compliance must contain the following information, for each production lot:
 - .1 The name of the pipes manufacturer.
 - .2 The production date and place.
 - .3 The class, category and nominal dimensions.
 - .4 Results of analyses, tests and quality control measures required by the NQ 2622-125 standard “Tuyaux circulaires en béton armé et non armé – Guide de fabrication et de contrôle de la qualité en usine ” (Circular reinforced and non-reinforced concrete pipes — Guide to production and quality control in the plant).
 - .5 The production lot number.
- .10 A production lot consists of pipes of the same class, category and dimension, which have been manufactured during a single ongoing production cycle under the same conditions.

2.2 SECURITY GRATE, LANDING, PLATFORM (UNDERGROUND STRUCTURE)

- .1 All landings, platforms, footbridges, security grates and other similar works, as well as their supports to be installed in underground structures shall be made of galvanized steel. All of these steel components shall be produced in the plant. All shall be welded and must be sturdy.
- .2 Security grates are required for manholes whose depth is equal to or greater than 3 m while landings, platforms and footbridges are required in manholes 6 or more meters deep.
- .3 Galvanized steel safety landings consist of two grates, which can be opened independently from each other and shall be installed at regular intervals (spaced every six meters maximum). The diameter of chimneys housing said landings shall be at least 1 200 mm (see detail).

2.3 GALVANIZED STEEL ACCESSORIES

- .1 When galvanized steel parts are required, hot dip galvanizing shall comply with the CAN/CSA-G164M-92, class C standard. The quantity of zinc deposited must be at least 610 g/m² of exposed surface.

- .2 The special paint, which can be used on the job site to protect a non-galvanized cut surface shall be a ready-mixed zinc-rich coating complying with CAN/CGSB-1.181 and ONGC 1-GP-181M standards.
- .3 The mechanical anchors used to secure accessories to the concrete walls must be of grade 316 stainless steel.

2.4 ALUMINIUM ACCESSORIES

- .1 Aluminum bars, pins, wires and extrusions, sheets or plates shall comply with the ACNOR HA.4-M1990 (6061-T6) standard. Rivets and bolts shall be of galvanized steel, except for the concrete wall's mechanical anchoring bolts, which shall be of grade 316 stainless steel. All aluminum elements shall be anodized after welding. Aluminum welding shall comply with the ACNOR HA.6-1980 (4043) standard. All aluminum in contact with the concrete, masonry or any material other than aluminum should be separated from the latter by neoprene at least 5 mm thick over the entire contact surface.

2.5 SEWER MANHOLE AND CATCH BASIN MANHOLE

- .1 Prefabricated sewer and catch basin manholes.
 - .1 Manholes and catch basin manholes shall be of reinforced concrete in compliance with the NQ 2622-420 standard. Unless otherwise indicated in the plans, manholes and catch-basin manholes shall be of the 1200 mm diameter and shall have rubber gaskets complying with NQ 2622-420 and ASTM C443M standards.
 - .2 On sanitary sewer pipes, manholes shall be watertight with rubber gasket joints and monolithic base poured on the bottom section of the manhole. The bottom of these manholes is built so that water is discharged through a semi-circular canal (gutter). The canal is smooth and even, and the curvature's radii are the longest allowed by available space; no sharp turn shall be accepted. The bottom is made entirely of concrete.
 - .3 Manholes on storm sewers shall be of the same type as those described above, the bottom featuring a semi-circular canal (gutter) as described in the preceding point. If the angle makes the use of a gasket impossible, a flexible watertight joint shall be produced using activated oakum. No rigid joint shall be accepted.
 - .4 The manufacturer shall hold a certificate of compliance with the ASTM C-443 standard for joint gaskets, issued by a Laboratory recognized by the Ministère des Transports du Québec (MTQ – Quebec Department of Transport).
 - .5 Concrete used in the construction of these manholes shall have a compressive strength of 40 MPa at 28 days, and these manholes shall be built in compliance with the NQ 2622-420 and ASTM C-478 standards. In all cases, the strictest standard shall prevail. The

surfaces of the manhole shall be those obtained upon removal of forms. The use of a surface coating or finishing mortar is not allowed.

- .6 Manhole elements likely to be located 600 mm or less from the profile of the street shall meet the requirements of tests with de-icing salts to determine resistance to freeze/thaw cycles, as described in the “Cahier des charges et devis généraux” issued by the Ministère des Transports du Québec (MTQ — Quebec Department of Transport). This compliance must be attested to by a Laboratory accredited by the MTQ.
- .7 All horizontal and vertical joints, which are not watertight, shall be immediately repaired by a specialized firm, which shall produce a special report confirming said repairs along with a two (2) years guarantee. This specialized firm must be approved by the Canada Parks Representative. Only flexible repair methods such as activated oakum, acrelamide or polyurethane injection are allowed. Any other flexible repair method shall be subject to an equivalence application. No rigid repair shall be permitted.

.2 Rungs and ladders

- .1 Materials used in the production of ladders and rungs are cold worked. Ladder bars are produced of 15 M deformed reinforcing steel with a spacing of 300 mm (12 in.) c/c at ± 25 mm and rungs made of 20 M deformed reinforcing steel with a spacing of no more than 300 mm (12 in.). The steel shall be galvanized. The ladder shall be secured to the wall using bolts screwed into anchors set in the concrete at the time of pouring.
- .2 The middle of the top bar shall never be more than 660 mm below the final elevation from the cover. Wall clearance shall be 150 mm from the recess.

.3 Frames, covers and grates

- .1 The frame and cover shall be of the adjustable type with guide rings and no other standard type shall be installed without the authorization of the Canada Parks Representative.
- .2 Cast iron and shaping for frames, guides and covers shall comply with the NQ 3221-500 standard. Parts shall be flawlessly moulded with no cracks, scars, blisters or other defects. The warping tolerance in all directions shall be less than 1 mm (1/32 in.). All parts whose weight is less than 95% of the weight indicated by the manufacturer shall be rejected. All cast-iron parts shall bear the manufacturer's name or trademark. All unidentified parts shall be refused.
- .3 In the case of all manholes and catch basin manholes located above grade, the frame shall be of class 30 grey cast iron while the cover and the grate shall be of class 65-45-12 ductile cast iron.
- .4 In the case of manholes located in paved areas, the frame and cover shall be produced from class 65-45-12 ductile cast iron while the conic guide shall be produced of grey

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- cast iron in self-adjusting model for the cover, with resilient frame seat for the frame and the guide channel.
- .5 The frame shall not rest directly over the guide channel. There shall be a space of at least 40 mm (1 1/2 in.) between the underside of the frame and the top of the guide channel. To this end, it is necessary to raise one side of the adjustable part and tamp down the bituminous mix between the supporting rim and the top of the concrete section of the manhole or catch basin manhole. Repeat the process on the other side to obtain even support under the entire rim, and exceed the level of surrounding pavement by 50 mm (2 in.) before running the roller.
 - .6 In the case of catch basin manholes located in paved areas, the frame shall be self-adjusting model with resilient frame seat. The frame and grate shall be of class 65-45-12 ductile cast iron and the guide channel shall be of class 25 grey cast iron.
 - .7 Frames, covers and grates for manholes and catch basin manholes shall be capable of withstanding heavy traffic.
 - .8 Covers must bear the following inscriptions, as the case may be:

“Storm sewer”, “Sanitary sewer”.
 - .9 For the standard type, the cast iron, shaping and machining of the frame and cover shall comply with ASTM standards for class 25 grey cast iron (Standard Specification Gray Iron Casting, Designation A-48).
- .4 Adjustment
- .1 To adjust manholes and chambers to the proposed elevation, the Contractor shall use heads whose heights shall vary from 200 to 475 mm. Heads shall have a continuous groove on the top face, to accommodate the installation of a strip of butyl as well as a lip to hold the frame or levelling ring.
 - .2 A standard ring measuring 300 mm in height shall be installed beneath the head, when the height of the manhole allows. No ring of a height other than 300 mm shall be installed directly beneath the head of the manhole.
 - .3 Stacking rings shall be installed in heights of 300, 600, 900, 1 200 and 1 800 mm.
- .5 Identification of parts
- .1 To ensure that parts are installed at the right location, it is necessary for them to be identified on the inside, respecting the numbering of manholes on the plans of the Canada Parks Representative.
- .6 Rubber adjustment risers

- .1 To adjust manholes measuring no more than 100 mm in height, the Contractor shall use rubber risers.
- .2 The types of rubber rings, which the Contractor may use, based on the adjustment height, are the following:
 - .1 Flat 12.5, 25, 38, 50 and 75 mm rubber rings.
 - .2 Angled 12.5-25, 25-38, 38-50, 50-63 and 63-75 mm rubber rings.

2.6 CATCH BASIN

- .1 Catch basin
 - .1 Catch basins shall be of reinforced concrete in compliance with the NQ 2622-420 standard. Unless otherwise indicated in the plans, catch basins will be 610mm diameter and have a butyl gasket.
 - .2 The catch basin's concrete shall have a compressive strength of 35 MPa while the head and levelling rings shall have a compressive strength of 40 MPa.
 - .3 Elements of all catch basin models shall meet the durability requirements of freeze/thaw cycle tests using de-icing salts, as described in the "Cahier des charges et devis généraux" issued by the Ministère des Transports du Québec (MTQ – Quebec Department of Transport). This compliance must be attested to by a Laboratory accredited by the MTQ.
 - .4 The base course rests on a stable sub-course and consists of a 150 mm cushion of MG-20b calibre crushed stone.
 - .5 Catch basins are connected to the storm sewer main by the DR-35 PVC pipe with a minimum diameter of 200 mm. The pipe's connection to the main uses a monolithic tee or appropriate saddle, and the Contractor shall only pierce mains using special drills produced specifically for this purpose.
 - .6 The connection between the pipe and the catch basin must have a rubber gasket. At every joint, sections of the catch basin must have a rubber gasket or butyl tape.
 - .7 When two (2) catch basins are connected in a series, the connection to the water main shall use a 300 mm-diameter PVC pipe.
 - .8 The use of a hammer to pierce the pipe is prohibited at all times.
 - .9 Backfilling around the catch basin shall be with MG-20b crushed stone compacted to 90 % of M.P. over a 600 mm width.

.2 Frames, grates and traps

- .1 The catch basin shall be of the adjustable type with guide rings and no other standard type can be installed without the authorization of the Canada Parks Representative.
- .2 The cast iron and shaping of frames, guides and covers shall comply with the NQ 3221-500 standard. They shall be flawlessly moulded with no cracks, scars, blisters or other defects. The warping tolerance in all directions shall be less than 1 mm (1/32 in.). All parts whose weight is less than 95 % of the weight indicated by the manufacturer shall be rejected. All cast-iron parts shall bear the manufacturer's name or trademark. All unidentified parts shall be refused.
- .3 In the case of the catch basin located above grade, the frame and grate shall be of ductile cast iron.
- .4 In the case of the catch basin located in paved zones, the frame and the guide channel shall be self-adjustable model. The frame and grate shall be of class 65-45-12 ductile cast iron and the guide shall be of class 25 cast iron.
- .5 Frames and grates shall be capable of withstanding heavy traffic.
- .6 In the case of standard types, catch basins shall have a ductile cast iron grate. Grates shall have a diameter of 750 mm and weigh a minimum of 75 kg. Grates rest on a cast iron seat anchored in the plant to the catch basin's head section. When subjected, in a position of use, to load test using a 200 mm-diameter plate the catch basin's grate shall be capable of withstanding a 150 kN load.
- .7 Catch basins shall be fitted with a class 30 grey cast iron trap.

.3 Rubber adjustment risers

- .1 To adjust the catch basin measuring no more than 100 mm in height, the Contractor shall use rubber risers.
- .2 The types of rubber rings, which the Contractor may use based on the adjustment height, are the following:
 - .1 Flat 12.5, 25, 38, 50 and 75 mm rubber rings.
 - .2 Angled 12.5-25, 25-38, 38-50, 50-63 and 63-75 mm rubber rings.

2.7 RUBBER JOINTS

- .1 All rubber joints for sewer and waterworks pipes shall comply with the standard applicable to the type of pipe involved.

2.8 ASPHALT MASTIC

- .1 In these exceptional cases when it is used in the production of sewer pipe joints, asphalt mastic shall comply with the ASTM's C-14 and C-76 standards. It shall be cold formed, lend itself to trowel application, be freeze and water resistant, be unaffected by waste water, and harden over time while retaining its elasticity. The mastic used shall provide a high level of adhesion to concrete and adequate tensile strength.

2.9 BEDDING AND SURROUND MATERIALS

- .1 Base course and cover materials shall comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.10 BACKFILL MATERIALS

- .1 Backfill materials shall comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.11 EXPANDED POLYSTYRENE INSULATION

- .1 Extruded expanded polystyrene insulation shall comply with the requirements of the CAN/ULC S701-97 type 4 standard (formerly the CAN/CGSB 51.20 - M87 standard), and shall have a minimal compressive strength of 415 kPa (60 psi).
- .2 Extruded expanded polystyrene insulation shall be supplied in panels measuring 600 mm x 2,400 mm.

2.12 GEOTEXTILE MEMBRANE

- .1 Geotextile membranes shall comply with the MTQ's standard 13101 - Geotextiles and shall be type III.

2.13 UNSHRINKABLE FILL

- .1 The unshrinkable fill shall comply with article "Unshrinkable Fill" of section 31 23 11 - Excavation and Backfilling - Underground Services.

2.14 LINING MATERIALS

- .1 The lining materials, in their final state, must have a uniform, hard, smooth surface free from defects such as perforations, foreign bodies, non-impregnated regions, air bubbles, etc. Lining or the inserted pipe must conform to the profile of the receiving pipe. In addition, it must be inert to the fluids carried in the sewer pipes.

PART 3 - EXECUTION

3.1 PREPARATION WORK

- .1 Clean and dry pipes and connectors prior to their installation and remove all defective material from the site, to the Canada Parks Representative's satisfaction.
- .2 Have pipes, connectors, manholes, catch basin manholes, and catch basins approved by the Canada Parks Representative prior to their installation.
- .3 Retain, protect and repair existing structures if required.

3.2 VERIFICATION OF THE LOCATION

- .1 After marking the location of underground installations, and before any pavement cutting or removal, or excavation activities for the installation of the pipes have been carried out, the Contractor shall verify, in the presence of the Canada Parks Representative, the location of existing sewer pipes.
- .2 The Contractor shall take measures to determine the depth of existing sewer pipes at the point where connections are to be made.
- .3 Following the excavation work, the Contractor shall verify the dimensions, type and condition of the exposed sewer pipe.
- .4 In the event that a condition, which is significantly different from those prescribed in the contract be discovered, the Contractor shall immediately notify the Canada Parks Representative of this finding.
- .5 When necessary, the profile shall be adjusted according to the Canada Parks Representative's instructions, so as to avoid any sudden changes in the slope and alignment of the sewer pipe and connection.

3.3 DIGGING OF TRENCHES

- .1 Dig trenches in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.4 PIPE BEDDING AND STRUCTURES

- .1 Have the layout and depth of the trench approved by the Canada Parks Representative before placing the bedding material.

- .2 The bedding and surround materials for pipes and underground structures shall be produced in compliance with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services and with the details on the drawings.

3.5 PIPE INSTALLATION

- .1 Pipes shall be installed in compliance with contract drawings, with all necessary connections and accessories. The Contractor shall clean the extremities and interior of the various parts prior to their assembly. All pipes shall have rubber gaskets.
- .2 Installation work shall be carried out dry at the bottom of the trench, in keeping with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services. The Contractor shall install pipes starting with the lowest point in the system, moving up the slope. Female pipe extremities shall be positioned upstream. The Contractor shall keep earth or debris from entering the pipes during installation. All pipes shall be installed in a straight line; each change in direction shall involve only one manhole. All pipes incorrectly aligned or collapsing following installation shall be removed and placed on a new bed.
- .3 Seal all lifting holes using prefabricated plugs approved by the Canada Parks Representative and secured with unshrinkable grout.
- .4 As needed, pipes shall be cut to accommodate special gaskets, connections and plugs, according to the manufacturer's instructions, without damaging the pipe or its coating, and to ensure that the tip of the pipe is smooth and perpendicular to the latter's axis.
- .5 Prefabricated saddle tees or connectors produced on site shall be used to connect new pipes to existing sewer pipes. Ensure that joints are solid and watertight.
- .6 When work is to be interrupted, temporarily block the ends of the pipes upstream, using removable watertight plugs.
- .7 Polyvinyl chloride (PVC) pipes shall be checked for distortion of the interior diameter upon final reception of the work or before paving work, or at a period specified by the Canada Parks Representative. The Contractor shall refer to this section's article "Distortion Tests".
- .8 On the 300 mm or less pipes, lubricant must be applied on the male end exclusively. The quantity used must be the minimal quantity recommended by the pipe manufacturer. No lubricant excess is tolerated inside the pipe.

3.6 PIPE INSULATION

- .1 Thermal insulation of all sewer pipes installed at a depth of less than 1,5 m is required.
- .2 Place the insulation over the compacted granular surround material covering the pipe as described in the detail provided.

- .3 Place the sheets lengthwise and parallel to the pipe's middle line, staggering the transversal joints.
- .4 Sheets shall be butt jointed and secured to prevent movement.

3.7 MANHOLE, CATCH BASIN MANHOLE AND CATCH BASIN

- .1 The Contractor shall supply and install, in locations indicated in contract drawings, prefabricated reinforced concrete sewer manholes, catch basin manholes and catch basins. Prefabricated underground structures shall be pre-approved by the Canada Parks Representative.
- .2 The Contractor shall take the following parameters into account when ordering these structures, including:
 - .1 The density of the fill material to be considered in the structural proportioning shall be that of saturated clay.
 - .2 The elevation of the ground water table to be taken into account is that which is equivalent to the finished ground surface. To this end, all structures shall take buoyancy into account.
 - .3 The structure shall be capable of withstanding heavy vehicle traffic.
- .3 Before proceeding with production, the Contractor shall provide the Canada Parks Representative with shop drawings, plans and diagrams of the installation, fitting and/or assembly related to the production and installation.
- .4 These structures shall be delivered in monolithic modules fitted with a lifting device allowing each unit to be easily handled and assembled with others on the work site. If lifting holes are required for lifting, these shall have been designed so as not to completely run through the element involved and not compromise watertightness. Only handling systems adapted to the lifting device and recommended by the supplier shall be used. The Contractor shall store the various modules on the work site so as not to damage them, particularly at the joints; all parts with cracks or signs of impact shall be replaced at the Contractor's expense.
- .5 Joints between each of the elements to constitute a given underground structure shall be fitted with a rubber gasket or a key path preventing lateral movement following assembly with a butyl gasket. Joints must first have been cleaned, lubricated and cleared of all materials and/or malformation, which could compromise assembly and/or watertightness.
- .6 Following assembly, all cavities or lifting holes present on the surface of the prefabricated elements shall be sealed using a filling compound.
- .7 In the case of prefabricated underground structures, the clear interior dimensions shall not vary by more than 12 mm (1/2 in.) from those shown in the contract drawings. The thicknesses of

walls, floor and roof shall not vary by more than 6 mm (1/4 in.) from those required. Following assembly, no divergence greater than 25 mm (1 in.) from the vertical determined by a plumb line shall be accepted for any wall of a prefabricated underground structure. No joint shall have an opening greater than 10 mm (3/8 in). Watertightness shall subsequently be verified by visual inspection; any infiltration noted during the inspection shall be caulked by the Contractor, to the Canada Parks Representative's satisfaction, using an epoxy-based compound.

3.8 CATCH BASIN CONNECTION

- .1 Unless otherwise indicated in the plans, the catch basins' connections to the main sewer line shall use DR-35 polyvinyl chloride (PVC) pipes with a diameter of 200 mm (8 in.) and joints with rubber gaskets. They shall be built at a minimum angle of 30° from the main sewer line's horizontal half-diameter. The construction of catch basin connections shall use a saddle tee installed on the main sewer.
- .2 A minimum clearance of 1,0 m shall be ensured between a catch basin connection and a main sewer joint or between two catch basin connections. In the latter case, it shall be preferable to carry out the connection on each side of one of the main pipe's joints.

3.9 BACKFILLING

- .1 Backfilling shall be carried out in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.10 LINING WORK

- .1 The Contractor must submit to Parks Canada Representative when submitting the tender documents the lining process he intends to use during the execution of the work. This process must be in compliance with the structural and waterproofing requirements described in these specifications and with the following:
 - Internal diameter: at least 90% of the diameter of the existing pipe
 - Roughness coefficient: equal to or less than Manning = 0.010
 - Lifespan: at least 50 years
- .2 The method and materials submitted by the Contractor must be in compliance with the requirements of a recognized standards agency in North America, such as ASTM or CSA.
- .3 Lining or pipe inserted must be continuous and follow the existing pipe to leave no annular space. Parks Canada Representative reserves the right at any time to refuse the work and to require its resumption if there is an annular space or to require the injection of a product which remains solid after cleaning to eliminate the annular space

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- .4 The inside diameter of the lining or of the inserted pipe must be verified by the Contractor using a template and must not be less than 90% of the diameter of the original pipe. The flexible tubular covering must be manufactured to such a size that, once installed, it completely follows the interior surface of the existing pipe. The Contractor must therefore verify the exact dimensions of the pipe before manufacturing the coating. A tolerance must be provided for circumferential shrinkage during ripening.
- .5 The coating of the treated pipe must have a waterproof plastic interior finish required for improved flow and for resistance to corrosion and abrasion. When subjected to an external hydrostatic pressure of 50 kPa, the repair must be waterproof over its entire length including the ends.
- .6 The Contractor must provide the Representative of Parks Canada when submitting the tender documents, a certification of the mechanical properties of the structural lining as well as the methodology used to calculate the wall thickness (according to the most recent revision of standard ASTM F1216) meeting the constraints mentioned below.
- .7 In addition, no deformation must be recorded when the lining is subjected to an external load of 225 Newtons / meter length / mm of internal diameter.
- .8 The calculation of the wall thickness must take in consideration the constraints submitted by an external hydrostatic pressure of 50 kPa and a soil reaction module of 5.0 MPa, a safety factor of 1.5 and a Poisson's ratio of 0.30.
- .9 The thermal expansion factor must be equal to or less than 0.0000432 cm / cm / ° C. The pipe finish used must be made of materials which, when cured, will give the pipe chemical resistance allowing internal contact with the domestic sewer at a continuous temperature below 60 ° C.
- .10 Two (2) samples of the lining with a minimum length of 300 mm must be prepared and submitted to a laboratory to certify that they meet the requirements of these specifications. The results of the laboratory and the design calculations for the thickness of the necessary lining must be submitted to the Representative of Parks Canada before starting the work. Analysis of these samples is at the Contractor's expense.
- .11 Although not described in this specification, the manufacturer's standards, directives and requirements are implicitly an integral part and the Contractor must respect them. For this purpose, all the documentation published by the manufacturer on the product used must be given to the Engineer before starting work.
- .12 Once the lining work is completed, the Contractor must provide a clear and precise television recording of the lining in place and the drilling operations when the culvert is put back into service. Data such as location, section identification, direction of travel, date, etc. must be saved in a key USB. The quality and definition of the image must be to the satisfaction of the Engineer. The costs related to the recording must be included in the prices submitted for the lining work.

3.11 CONNECTION TO EXISTING PIPES OR UNDERGROUND STRUCTURES

- .1 Projected pipes:
 - .1 The Contractor shall carry out the connection of all projected pipes to existing pipes or underground structures. To this end, he shall first locate and clear existing pipes or underground structures and determine their exact profile and diameter to ensure that that parts needed for connecting work are available on site when the work is to be carried out. He shall then empty existing pipes, pierce existing underground structures, provide the special connectors required and produce all watertight joints needed to connect the proposed pipes to existing pipes or underground structures.
 - .1 Connections without rubber gaskets: For sanitary pipes of more than 610 mm and storm sewers, all pipe connections to existing sewer manholes shall be carried out using a form, outside the manhole, into which a minimum 15 cm thickness of unshrinkable mortar shall be placed. It is necessary to ensure that the excavation remains dry until the concrete has set.
 - .2 Interior finish of sewer manholes: The interior finish of existing sewer manholes calls for concreting the bottom of the sewer manholes so as to adopt the form of sewer pipes in place by forming a semi-circular channel up to half the pipe's diameter. This correction immediately follows the progression of the work. The channel shall be smooth and even, with radii as long as available space allows, with no sharp turns shall be allowed.
- .2 Projected underground structures (manholes, catch basins, etc.):
 - .1 The Contractor shall carry out the connection of all projected or existing pipes to projected underground structures. To this end, he shall first locate and clear existing pipes to determine their exact profile and diameter. He shall then supply the special connectors required by the pipes and produce all watertight joints needed for the connection to projected underground structures.

3.12 SERVICE INTERSECTIONS

- .1 Wherever underground municipal services or public utilities intersect, a minimum clearance of 300 mm (12 in.) shall be maintained except in the case of municipal service entrances where this value can be reduced to 150 mm (6 in.). The minimal clearance shall be increased to 500 mm (20 in.) in the event that a sewer pipe is built parallel to another municipal service or public utility.
- .2 Where proposed pipes intersect or a proposed pipe crosses under an existing service, the Contractor shall fill the space between the two services using a Class A granular material compacted to 95 % M.P. Furthermore, the last space beneath the top service, which cannot be

correctly filled with compacted Class A material, shall be filled with unshrinkable fill to prevent compaction.

3.13 REPAIRS

- .1 All work to be redone or repaired shall be carried out at the Contractor's expense before the Canada Parks Representative recommends the provisional acceptance of the work.
- .2 If major repairs are required following tests described in the aforementioned articles, the Canada Parks Representative shall require that a special CCTV inspection be carried out, at the Contractor's expense, where repairs were made.
- .3 When the floors and rises have been located, a maximum tolerance of 10 % of the nominal diameter shall be accepted. Should the floors or rises exceed this tolerance, the Contractor shall be required to redo the defective part of the sewer, rendering it acceptable.
- .4 Sewer lines must end with a female end. In the event of the impossibility of a straight alignment of the services, only long radius bends are accepted.

3.14 WATERTIGHTNESS TESTS AND ACCEPTANCE (STORM SEWER)

- .1 Generalities
 - .1 In the case of the storm sewer, no watertightness test will be carried out IN the joints of these pipes; only a CCTV inspection with video recording shall be conducted. Infiltrations detected by the CCTV inspection shall be caulked by the Contractor to the Canada Parks Representative's satisfaction.
- .2 Cleaning
 - .1 Throughout the duration of the work and until its provisional acceptance by the Canada Parks Representative, it shall be necessary to keep all drains, sewer pipes, manholes, catch basins and their connections absolutely clean and free of all obstructions. The Contractor shall also be responsible for any damage resulting from the sewer's poor operation.
 - .2 Prior to a CCTV inspection, before the work has been accepted and the pipes put into service, a complete cleaning shall be carried out. No product or coating shall be applied to the structures before the tests.
 - .3 Should the volume of debris be significant, the Contractor shall hire a specialized firm to produce a report attesting to the cleaning of the pipes. The Canada Parks Representative shall be provided with a certificate attesting to the disposal of sludge at an authorized site. The Contractor shall then be required to run clean water through the system from

the point(s) upstream from the system until the water runs downstream filling every possible floor.

.3 CCTV Inspection

- .1 The Contractor shall arrange to have a specialized firm conduct an inspection, using a camera with a rotating head and video recording, of all sewer pipes installed within the framework of this contract. Any irregularities in the pipes, joints, connectors, or lack of cleanliness in the system etc, shall be pinpointed and photographed. The Contractor shall provide the Canada Parks Representative with the report of the televised inspection along with two (2) copies of the videocassette or DVD. The Contractor shall, at his own expense, carry out any work required to redo, clean or repair structures deemed to so require.
- .2 Should major repairs be required following a first inspection, the Canada Parks Representative may, if he deems it necessary, demand a second CCTV inspection of strategic locations. This second inspection shall be carried out at the Contactor's expense.

3.15 DISTORTION TEST

- .1 The distortion test shall comply in every regard to the requirements of the BNQ 1809-300 standard.
- .2 The distortion test applies to the following types of pipes: polyvinyl chloride (PVC), high-density polyethylene (PEHD), corrugated aluminized steel or aluminum, and ribbed aluminized steel.
- .3 After proper cleaning, the Contractor shall check the distortion of every storm and sanitary sewer pipe. It is recommended that this measure be combined with the CCTV inspection test, which would make it possible to better visualize distortion.
- .4 Any distortion of the true inner diameter exceeding 5 %, verified after the complete backfilling of the pipe and prior to the provisional inspection of the pipe shall result in the replacement of the pipe involved.
- .5 Any distortion of the true inner diameter exceeding 7,5 %, verified between 60 and 30 days prior to the final reception of the work shall result in the replacement of the pipe involved.
- .6 Verification of the true inner diameter shall be carried out in the presence of the Canada Parks Representative and to the latter's satisfaction, using a unit providing at least 9 points of contact with the pipe or a laser profilometer whose measuring accuracy is at least 0,25 %.
- .7 Verification of distortions shall be carried out by a specialized firm approved by the Canada Parks Representative and the original of its report shall be signed by an engineer who is a member in good standing of the Ordre des Ingénieurs du Québec or a technologist employed by

the firm, and handed to the Canada Parks Representative. The use of a vibration dissolution unit is prohibited.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 Refer to laws, by laws, ordinances, rules, regulations and orders or authority having jurisdictions, and other legally enforceable requirements applicable to Work at that area, or become in force during Work performance
- .2 Canada Water Act (R.S.C., 1985, c. C-11)
 - .1 Comprehensive Water Resource Management
- .3 Canada Labour Code, Part 2, Canada Occupational Health and Safety Regulations.
 - .1 Canadian Centre for Occupational Health and Safety (CCOHS), OSH Answers Fact Sheets, Working on or near water.
- .4 Fisheries Act (R.S.C., 1985, c. F-14)
 - .1 Fisheries and Oceans Canada (DFO)
- .5 Species at Risk Act (S.C. 2002, c. 29)
- .6 Migratory Birds Convention Act, p 1994, S.C. 1994, c. 22.
- .7 Canadian Environmental Protection Act, 1999 (CEPA 1999).
- .8 Canada National Parks Act (S.C. 2000, c. 32).
- .9 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Landscape Standard [2016], First Edition
 - .2 Canadian Nursery Stock Standard [2017], Ninth Edition
- .10 United States Environmental Protection Agency (EPA)
 - .1 EPA-833-R-06-004, Developing Your Stormwater pollution Prevention Plan: A Guide for Construction Sites

1.2 COORDINATION

- .1 Coordinate the requirements by authority having jurisdictions of each province/territory to Parks Canada Representative, as applicable, to achieve compliance during work performance.
 - .1 Freshwater timing windows for carrying out work in fish habitat (Government of Quebec)
 - .2 Periods of low risk to fish and fish habitat in marine and estuarine environments.

1.3 PRE-INSTALLATION MEETINGS

- .1 Arrange for a Site visit, before Work starts, with Parks Canada Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
 - .2 Examine existing Site conditions and adjacent areas to construction's work, before start.
 - .3 Identify potential impact on existing aquatic and riparian habitats and water quality.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Ensure a dewatered condition for operation of equipment within watercourses. Operation of construction equipment in water is prohibited.
- .2 Install stabilized entrances at equipment access points to dewatered watercourses.
- .3 Use rubber tracked machinery when working on watercourse bed material.
- .4 Design and construct temporary crossings to minimize environmental impact to watercourse.
- .5 Constructing temporary crossings of watercourses where spawning beds are indicated is prohibited.
- .6 Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited.
- .7 Construct settling ponds sufficiently deep and wide to retain runoff long enough to permit suspended sediments to settle to the bottom.
- .8 Running/idling equipment or trucks must be reduced to prevent damage from exhaust fumes and mitigate risk of fire from exhaust heat.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Silt Fencing:
 - .1 Consisting of non-woven geotextile with manufactured seams as resistant as the geotextile material itself. The geotextile shall be in one piece.
 - .2 Stakes to be natural wood, minimum 1.5 metres in length, sized to withstand peak flows.
- .2 Pumps:
 - .1 The inlet and outlet of pumps and hoses for use in-water to be screened to prevent aquatic fauna from entering the equipment.

Part 3 EXECUTION

3.1 EXISTING CONDITIONS

- .1 Maintain existing flow pattern in natural watercourse systems.
- .2 In natural systems maintain existing riffle pool and step pool patterns.
- .3 In wetland systems, maintain existing hydrological conditions.

3.2 SITE CLEARING AND PLANT PROTECTION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls once disturbed areas have been restored and stabilized.
 - .4 Choose erosion and sedimentation control products that reduce the risk of attracting or entangling wildlife, that prevent the introduction of invasive alien species, and that are made from 100% biodegradable materials (e.g. sisal or coconut fiber). Ensure that the support materials are also biodegradable.
- .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
- .3 Existing saturated logs along base of shoreline to be disturbed to be collected and secured within a floating boom system. Logs to remain saturated at all times. Upon completion of watercourse alterations, reinstate logs along base of slope in a manner similar to existing conditions.
- .4 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
- .5 Protect roots of designated trees to dripline or as instructed by Parks Canada Representative during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .6 Maintain temporary erosion and pollution control features installed under this contract.

3.3 RECOVERY OF AQUATIC FAUNA

- .1 To minimize impacts on aquatic fauna, during installation of water isolation techniques, use a combination of netting and loud noises or vibrations to scare any trapped fish, reptiles or amphibians towards a temporary opening. Once completed, close off the opening.

- .2 Once the aquatic work area is secured, the isolated area of water is to be electrofished to remove any remaining aquatic fauna.
- .3 Captured aquatic fauna to be placed back in the active river flow or moved to a similar habitat outside the work area.
- .4 Protect edges of work area to prevent the reintroduction of reptiles and amphibians to the work area.

3.4 DRAINAGE

- .1 Pumping water containing suspended materials into watercourse is prohibited.

3.5 REMOVAL OF SEDIMENT CONTROL MEASURES

- .1 Sediment control measures to remain in place at all times during the work in order to catch and filter any run-off from the worksite before it reaches the watercourse.
- .2 Measures to remain in place until the growth of seed, sod or other surface cover is sufficient to retain sediments from being mobilized in runoff.
- .3 Method of removal of sediment control measures to be submitted for approval by Parks Canada Representative.
- .4 For in-water sediment control measures, allow minimum 1 day for settlement of suspended sediments before removal.

3.6 SITE RESTORATION

- .1 At the end of the under water works, restore the walls of the existing canal and as indicated on the plans and the geotechnical report attached to the appendix

END OF SECTION

STRUCTURE SECTIONS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 03 – Concrete Repair.

1.2 REFERENCES

- .1 CSA International
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 **Submit procedure** and demolition drawings with typical cross-section:
 - .1 Submit for review and approval by the Government Representative shoring and underpinning drawings showing the proposed methods. These documents must be signed and sealed by a professional engineer, member in good standing of the *Ordre des ingénieurs du Québec*. Drawings, diagrams or details indicating the order of demolition, shoring, underpinning necessary must be submitted to the Parks Canada Representative.
 - .2 Drawings must include proposed work method. Submit drawings of mobilisation area indicating temporary facilities and shores, dismantling and demolition methods. Drawings must be prepared by a competent engineer who is a member in good standing of the *Ordre des ingénieurs du Québec*.
 - .3 No demolition can commence prior to the revue and approval by the Parks Canada Representative.
- .3 Design Submittals:
 - .1 Submit all required technical specification documents concerning equipment the Contractor plans to use during the work and demolition to the Parks Canada Representative. Equipment is only authorized when the technical specifications conform to the requirements.
- .4 Required documents/samples concerning sustainable design.
 - .1 Management of construction waste.
 - .1 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 % of construction wastes were

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recycled or salvaged in accordance to Section 01 74 19 – *Waste Management and Disposal*.

1.4 SITE CONDITIONS

- .1 Protection de l'environnement
 - .1 Perform works in accordance with section 01 35 43 – *Environmental Procedures*.

Part 2 Products

2.1 MATERIALS

- .1 For the fine demolition of seats, use a manual pneumatic hammer not exceeding 15 kg.
- .2 Demolition of concrete at the intersection point of 2 saw cuts shall be carried out using a 7 kg manual pneumatic hammer.
- .3 For demolition of concrete in recessed wall sections or within 150 mm of piping:
 - .1 Type of hammer: pneumatic or manual
 - .2 Maximum weight: 7 kg
 - .3 Hammerhead: Spade
- .4 The Parks Canada Representative may, at any time, request a capacity reduction of authorized demolition equipment when he determines that the demolition work is causing damage to the reinforcement or concrete to be saved.

2.2 TEMPORARY RETAINING STRUCTURES

- .1 Temporary retaining structures needed for demolition, underpinning and other foundation support must be designed by a competent engineer who is a member in good standing of the *Ordre des ingénieurs du Québec*.

Part 3 Execution

3.1 EXAMINATION

- .1 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .2 Notify and obtain approval of utility companies before starting demolition.
- .3 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Parks Canada Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

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**DEMOLITION – MINOR
WORKS**

.2 Immediately notify Parks Canada Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

.4 Execute Work in accordance to Section 01 71 00 – *Examination and Preparation*.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary geotextile sedimentation control measures in accordance to Section 01 35 43 – *Environmental Procedures*.

3.3 PROTECTION

.1 Do Work in accordance with Section 01 35 43 – *Environmental Procedures*, Section 01 56 00 – *Temporary Barriers and Enclosures* and Section 01 35 29.06 – *Health and Safety Requirements*.

.2 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.1 Provide and install bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by the Parks Canada Representative.

.2 Support affected structures and, if safety of structure being demolished or soil stability appears to be endangered, take preventive measures, stop Work and immediately notify Parks Canada Representative.

.3 Keep noise, dust, and inconvenience to occupants to minimum.

.4 Provide temporary dust screens, tools that limit the spread of dust, covers, railings, supports and other protection as required.

3.4 IMPLEMENTATION

.1 Demolish and remove items as indicated on plans or by the Parks Canada Representative.

.2 Demolition

.1 Take necessary precautions to avoid damage to existing parts to be retained during concrete demolition work. For this purpose, authorized pneumatic demolition equipment can be found in Part 2 of the present Section.

.2 Areas to be demolished shall be outlined by a saw line 75 mm deep perpendicular to the surface on all faces. The depth of the saw cut is reduced as necessary to avoid damage to the rebars. Saw cuts must not cross. Perform saw cuts on all faces and parts to be demolished.

**DEMOLITION – MINOR
WORKS**

- .3 The Contractor is responsible for the quality of the saw cuts throughout the work. In the event that a saw line is damaged by traffic or equipment, it must be repaired at the contractor's expense.
- .4 The Contractor shall take the necessary precautions to avoid damage to the concrete and not bend or damage the rebar to be retained. The bars damaged by the Contractor during the work must be replaced at his own expense, taking into account a minimum overlap length of 600 mm.
- .5 After demolition, cleaning with a pressurized water jet (pressure 15 MPa, flow rate 20 L / min, circular nozzle concentrates and nozzle-to-cement distance of 150 mm to 200 mm). Must be carried out on:
 - .1 Exposed rebar following the demolition of concrete to remove rust.
 - .2 Concrete surfaces to be retained to detach any small pieces of concrete that no longer adhere to the surface and to obtain a rough surface for better adhesion to the new concrete.
- .3 After final surface cleaning, the Parks Canada Representative will review the condition of the remaining concrete to ensure that there are no moving parts.
- .4 After wall repair and replacement work completed, temporary retaining structures must be dismantled and removed, unless otherwise indicated by the Parks Canada Representative.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – *Cleaning*.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – *Cleaning*.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

STRUCTURE DEMOLITION

Part 1 General

1.1 SUMMARY

- .1 This Section includes requirements for the following:
 - .1 Demolition and removal of buildings and structures.
 - .2 Demolition and removal of site improvements adjacent to a building or structure being demolished.
 - .3 Demolition and removal of concrete foundations.
 - .4 Abandoning in place or Removing below grade construction.
 - .5 Protect, secure, capping or sealing site utilities.
- .2 This section does not include for the removal of Hazardous Substances or asbestos abatement, or selective demolition of interior building components and finishes.
- .3 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; contractor representative is required to develop these details further by submitting a demolition plan prepared by a professional engineer.

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 - Demolition - Minor Works.

1.3 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA S350-[M1980 (R2003)], Code of Practice for Safety in Demolition of Structures.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012.
 - .2 Canadian Environmental Protection Act (CEPA), 2012.
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .3 National Research Council Canada (NRC)
 - .1 National Building Code of Canada [2015] (NBC).
- .4 Underwriters' Laboratories of Canada (ULC)

STRUCTURE DEMOLITION

- .1 CAN/ULC-S660-[08], Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.
- .2 ULC/ORD-C58.15-[1992], Overfill Protection Devices for Flammable Liquid Storage Tanks.
- .3 ULC/ORD-C58.19-[1992], Spill Containment Devices for Underground Flammable Liquid Storage Tanks.
- .5 United States Environmental Protection Agency (EPA)
 - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
 - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
 - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 DEFINITIONS

- .1 Demolition: rapid destruction of building following removal of Hazardous Substances.
- .2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.
- .3 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.
- .4 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in structure indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal and as follows:
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or rehabilitation project
- .5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Parks Canada Representative for the material ownership as follows:

STRUCTURE DEMOLITION

- .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Parks Canada Representative's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Parks Canada Representative that may be encountered during demolition remain Parks Canada Representative 's property:
 - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Parks Canada Representative.
 - .2 Coordinate with Parks Canada Representative's, who will establish special procedures for removal and salvage operations.
- .2 Pre-Demolition Meetings:
 - .1 Convene pre-installation meeting 1week prior to beginning work of this Section, with Parks Canada Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work.
 - .3 Co-ordination with other construction subtrades.
 - .2 Hold project meetings every week.
 - .3 Ensure key personnel, site supervisor and project manager attend.
 - .4 WMC must provide written report on status of waste diversion activity at each meeting.
 - .5 Parks Canada Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .3 Scheduling:
 - .1 Employ necessary means to] meet project time lines without compromising specified minimum rates of material diversion.
 - .1 In event of unforeseen delay notify in writing Parks Canada Representative.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province as follows:
 - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

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**STRUCTURE
DEMOLITION**

- .2 Submit in accordance with Section 01 33 00 - Submittal Procedures and Section 01 74 19 - Waste Management Disposal.
- .3 WMC is responsible for fulfilment of reporting requirements.
- .4 Schedule of Demolition Activities: Coordinate with Section 01 32 16.19- Construction Progress Schedule Bar (Gantt), and indicate the following:
 - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services
 - .4 Locations of temporary partitions and means of egress
- .5 Demolition Plan: Submit a plan of demolition areas such as the pillar of the unstable old power plant indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction.
- .6 Proposed Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.
- .7 Inventory: Submit a list of items that have been removed and salvaged after demolition is complete.
 - .1 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
 - .2 Pre-demolition Photographs: Submit photographs indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by demolition operations.
- .2 Informational Submittals: Provide the following submittals when requested by the Consultant:
 - .1 Certificates: Submit Statement of Refrigerant Recovery as follows:
 - .1 Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to regulations of Authority Having Jurisdiction.
 - .2 Include name and address of technician and date refrigerant was recovered.
 - .2 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Parks Canada Representative, for work of similar complexity and extent.
- .3 Sustainable Design Submittals:

STRUCTURE DEMOLITION

- .1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with authorities having jurisdiction.
- .2 Construction Waste Management: Submit project CWM Plan highlighting recycling and salvage requirements in accordance with Section 01 74 19 - Construction Waste Management and Disposal, and as follows:

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.
 - .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
 - .2 Standards: Comply with ANSI A10.6 and NFPA 241
- .2 Regulatory Requirements: Perform work of this Section in accordance with the following:
 - .1 Provincial/Territorial Workers' Compensation Boards/Commissions.
 - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs.

1.8 SITE CONDITIONS

- .1 Environmental protection:
 - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Do not bury rubbish waste materials.
 - .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .6 Ensure proper disposal procedures are maintained throughout project.
- .2 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Parks Canada Representative.
- .4 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

STRUCTURE DEMOLITION

- .7 Parks Canada Representative will occupy another building immediately adjacent to demolition area.
- .8 Conduct structure demolition so Owner and Parks Canada Representative's operations will not be disrupted:
 - .1 Provide not less than 48 hours' notice to Parks Canada Representative of activities that will affect operations.
 - .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities:
 - .1 Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from Authority Having Jurisdiction.
- .9 Parks Canada Representative assumes no responsibility for buildings and structures being demolished:
 - .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - .2 Remove, protect and store salvaged items as directed by Parks Canada Representative before structure demolition.
 - .3 Salvage items as identified by Parks Canada Representative.
 - .4 Deliver to Owner as directed.

1.9 EXISTING CONDITIONS

- .1 Discovery of Hazardous Substances: Immediately notify Parks Canada Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:
 - .1 Hazardous substances will be as defined in the Hazardous Products Act.
 - .2 Stop work in the area of the suspected hazardous substances.
 - .3 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
 - .4 Hazardous substances will be removed by contractor under a separate contract or as a change to the Work.
 - .5 Proceed only after written instructions have been received from Parks Canada Representative.

Part 2 Products

2.1 EQUIPMENT

- .1 Equipment and heavy machinery:
 - .1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

STRUCTURE DEMOLITION

- .2 Off-road vehicles to: EPA CFR 86.098-10.
- .3 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

2.2 TEMPORARY SUPPORT STRUCTURES

- .1 Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in Province of the Work.

2.3 SOIL MATERIALS

- .1 Satisfactory Soils: Provide soil in accordance with Section 31 14 11 – Grading.

Part 3 Execution

3.1 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Review Project Record Documents of existing construction provided by Parks Canada Representative.
- .3 Parks Canada Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .4 Inventory and record the condition of items being removed and salvaged.
- .5 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- .6 Promptly submit a written report to Parks Canada Representative.
- .7 Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during structure demolition operations.
- .8 Verify that Hazardous Substances have been remediated before proceeding with structure demolition operations.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction.

STRUCTURE DEMOLITION

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:
 - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Prevent movement, settlement or damage of adjacent landscaping, adjacent grades, structures, parts of existing structure to remain, walks, properties, services, trees.
 - .1 Provide bracing, shoring as required.
 - .2 Repair damage caused by demolition as directed by Parks Canada Representative.
 - .3 Support affected structures and, if safety of structure being demolished adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Parks Canada Representative.
 - .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

3.3 DEMOLITION

- .1 Protect demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 Prior to start of Work remove contaminated or hazardous materials listed as hazardous as defined by authorities having jurisdiction as directed by Parks Canada Representative from site and dispose of at designated disposal facilities in safe manner. Refer Existing Conditions in PART 1.
- .5 Demolish the pillar of the old powerhouse as well as the elements that will be rebuilt such as some walls and slabs.
- .6 The demolition of the pillar will have to be done manually or with reduced size equipment, as tree cutting is not permitted and the space allowing access to the old powerhouse is restricted. There is also an overhead power line over the site . All debris will also have to be transported off-site
- .7 To permit as indicated and construction of addition.
- .8 Crush concrete generated due to demolition to size suitable for recycling.
 - .1 Where possible identify markets which will accept crushed material as aggregate.

STRUCTURE DEMOLITION

- .2 For further information regarding acceptable uses contact Provincial/Territorial aggregate producers associations.
- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces and replace as work progresses.
- .10 At end of each day's work, leave Work in safe and stable condition.
- .11 Demolish to minimize dusting. Keep materials wetted as directed by Parks Canada Representative.
- .12 Demolish masonry and concrete walls in pieces suitable for reuse as specified.
- .13 Remove structural framing.
- .14 Contain fibrous materials to minimize release of airborne fibres while being transported within facility.
- .15 Only dispose of material specified by selected alternative disposal option as directed by Parks Canada Representative.
- .16 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .17 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.

3.4 SITE RESTORATION

- .1 Below Grade Areas: Rough grade below grade areas ready for further excavation or new construction.
- .2 Below Grade Areas: Completely fill below grade areas and voids resulting from structure demolition operations with satisfactory soil materials according to backfill requirements in Section 31 14 11 - Grading.
- .3 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes.
- .4 Provide a smooth transition between adjacent existing grades and new grades.

3.5 REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by structure demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

**STRUCTURE
DEMOLITION**

3.6 CLEANING

- .1 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 19 - Construction Waste Management and Removal.
- .2 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .3 Divert excess materials from landfill to site approved Parks Canada Representative.
- .4 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.
- .5 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
 - .1 Label stockpiles, indicating material type and quantity.
- .6 Separate from general waste stream each of following materials. Stockpile materials in neat and orderly fashion in location and as directed by Parks Canada Representative for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations.
 - .1 Wiring and conduit.
 - .2 Miscellaneous metals.
- .7 Supply separate, clearly marked disposal bins for categories of waste material. Do not remove bins from site until inspected and approved by Parks Canada Representative.]
- .8 Remove stockpiled material as directed by Parks Canada Representative, when it interferes with operations of project construction.
- .9 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .10 Transport material designated for alternate disposal using approved receiving organizations listed in Waste Reduction Workplan and in accordance with applicable regulations.
 - .1 Written authorization from Parks Canada Representative is required to deviate from haulers and receiving organizations listed in Waste Reduction Workplan.
- .11 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal facilities must be those approved of and listed in Waste Reduction Workplan.
 - .2 Written authorization from Parks Canada Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

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**STRUCTURE
DEMOLITION**

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes: work requirements for the repair of cracks and provision of surface coating using Epoxy Injection grouting system in accordance with the scope of work listed in Section 01 11 00 - Summary of Work and as shown on construction drawings.

1.2 MEASUREMENT AND PAYMENTS

- .1 Measurement Procedures: in accordance with Section 01 29 00 - Payment Procedures.
- .2 Epoxy injection system and chemical grout will be measured in lineal metres.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Site Visit: Schedule a site visit with Parks Canada Representative to examine existing site conditions and to verify cracks conditions and surface repairs work as required before work starts.

1.4 RELATED REQUIREMENTS

- .1 []

1.5 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM C109/C109M-[16a], Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).
 - .2 ASTM C496/C496M-[17] Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
 - .3 ASTM C881/C881M-[15], Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .4 ASTM D638-[14], Standard Test Method for Tensile Properties of Plastics.
 - .5 ASTM D695-[15], Standard Test Method for Compressive Properties of Rigid Plastics.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

**EPOXY
INJECTION/CHEMICAL
GROUT**

- .1 Submit manufacturer's instructions, printed product literature and data sheets for grouting compounds and include product characteristics, performance criteria, physical properties, finish and limitations.
- .3 Submit two copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.8 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Applicator: company or person name specializing in Epoxy Injection Grouting or Chemical Grouting work with a list of previously completed similar work.
 - .2 Manufacturer's Instructions: submit manufacturer's application instructions and special handling criteria, cleaning procedures, storage and disposal methods.
 - .3 Provide testing, results, reports for review by Parks Canada Representative and do not proceed without written approval when deviations from mix design or parameters are found.
 - .1 Submit in accordance with Section 01 45 00 - Quality Control.

1.9 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Maintain uniform minimum temperature of [15] degrees C and humidity of [20%] to [40%] before and during application as well as after completion.
 - .2 Temperature of concrete being bonded must be [7] degrees C and to be maintained at this temperature for [24] hours during curing of epoxy.
 - .3 Use epoxy injection system only for well-ventilated areas and not into a building.

Part 2 Products

2.1 MATERIALS

- .1 Epoxy injection system: two component, modified epoxy resin capable of structurally rebonding cracks, delaminations and hollow planes in portland cement concrete, 100% solids, [zero VOCs].
 - .1 Zero VOC material: pre-packaged cartridge kit with manual shotgun style static nozzle gun.
 - .1 To ASTM C881/C881M: Type IV, Grade 1, Class A, B, C.
 - .2 Tensile elongation to ASTM D638 (7 days): 1-4%.

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- .3 Compressive Strength to ASTM D638 (7 days): 58 MPa.
- .2 Very Low Viscosity Injection Resin:
 - .1 To ASTM C881/C881M: Type [I], [II], Grade 1, Class B and C.
 - .2 Tensile elongation to ASTM D638 (14 days): 3-4%.
 - .3 Compressive Strength to ASTM D695 (28 days): 61 MPa.
- .2 Epoxy injection system: two-component, modified epoxy resin and modified amine curing agent pumped and mixed at gun nozzle, 40 MPa compressive strength, elongation 4%, flexural strength 50 MPa.
- .3 Epoxy resin: low viscosity, two component modified epoxy resin and modified curing agent pumped and mixed at gun nozzle, elongation 1.6%, moisture insensitive, frost resistant, clear colour.
 - .1 Tensile strength to ASTM D638: 48 MPa at 7 days.
- .4 Epoxy gel sealer: non-sag, two component epoxy gel for sealing cracks and setting injection entry ports.
 - .1 Tensile strength to ASTM D638: 28 MPa at 7 days
- .5 Chemical grout: water curing injection resin forming an elastic rubber consistency that has excellent bonding and flexibility properties.
- .6 Crack sealer: type recommended by manufacturer of epoxy or chemical grout.
- .7 Epoxy grout: low viscosity, two component modified epoxy resin and modified curing agent pumped and mixed at gun nozzle, elongation 1.6%, moisture insensitive, frost resistant, clear colour.
 - .1 Compressive strength to ASTM C109/C109M: 84 MPa at 7 days.
 - .2 Tensile strength to ASTM D638: 48 MPa at 7 days.
- .8 Epoxy sealer: non-sag, two component epoxy gel for sealing cracks and setting injection entry ports.
 - .1 Tensile strength to ASTM D638: 22 MPa at 7 days.

Part 3 Execution

3.1 PREPARATION

- .1 Contractor shall clean cracks and make sure they are free of rust, sand and debris.
 - .1 Injection is not recommended where steel has already begun expanding due to corrosion.
 - .2 Contractor shall assess the condition inside the crack, and take cores where cracks are dirty and structural repair is desired rather than a sealing operation.

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- .2 Check size and vacuum drilled cracks in travelled areas, as their top edges might be broken away due to freeze-thaw action and shear forces.
- .3 Clean cracks and fractures to receive epoxy resin with pressure water jet or compressed air.
 - .1 Do not use where cracks are filled with water. Cracks should be dry for maximum bond.
- .4 Drill crack for injection ports or T-fittings.
- .5 Apply crack sealer over front surface of crack and allow it to dry sufficiently before injection of epoxy in accordance with manufacturer's instructions.

3.2 EPOXY PRESSURE GROUTING

- .1 Mix and apply epoxy crack sealer and set injection ports in accordance with manufacturer's instructions and space at not more than 1-1/2 times the crack depth.
- .2 Set injection gun to sufficient pressure to inject resin to full depth of crack.
- .3 Inject epoxy resin in accordance with manufacturer's instructions.
- .4 Remove epoxy resin injection ports. Restore concrete surfaces to original profiles.

3.3 SURFACE REPAIRS

- .1 Rebuild surface profile and fill with material to match adjacent construction.
- .2 Install repair material in accordance with manufacturer's instructions.

3.4 TESTING

- .1 Take 3 concrete cores and demonstrate epoxy penetration and bonding of typical crack in structures to be repaired in areas selected by Parks Canada Representative shown on drawings at initial stage of work.
- .2 Test concrete cores for Compressive Strength in accordance with ASTM C109/C109M at 7 days.
- .3 Test concrete cores for Tensile Strength in accordance with ASTM C496/C496M.
- .4 Make subsequent tests in work completed in areas selected by Parks Canada Representative.
- .5 Make good areas of test with material and finish to match existing structure.
- .6 Maintain facilities required to allow Parks Canada Representative access for inspection of work completed.

3.5 INSPECTION

- .1 Parks Canada Representative will inspect work for
 - .1 Adherence to specific procedures and materials.

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- .2 Final cleanliness and completion.
- .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.6 CLEANING

- .1 Progress cleaning in accordance with Section 01 74 11 - Cleaning.
- .2 Leave work area clean at end of each working day.
- .3 Divert unused grouting compounds and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Parks Canada Representative.
- .4 Do not dispose of unused grouting compounds and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .5 Prevent grouting compounds and additive materials from entering drinking water supplies or streams.
- .6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.
- .7 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.
- .8 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .9 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

3.7 PROTECTION OF COMPLETED WORK

- .1 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

CONCRETE FORMING AND ACCESSORIES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 30 00 – Cast-In-Place concrete.
- .3 Section 03 30 03 – Concrete Repair.

1.2 REFERENCES

- .1 All concrete repair work must be carried out in accordance with the latest version of the following standards, unless otherwise indicated.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-O86, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151-04, Canadian Softwood Plywood.
 - .5 CSA O153, Poplar Plywood.
 - .6 CAN/CSA-O325, Construction Sheathing.
 - .7 CSA O437, Standards for OSB and Waferboard.
 - .8 CSA S269.1, Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada.
- .3 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 Ministère des Transports du Québec (MTQ)
 - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*
 - .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de masses volumiques normales*.
 - .3 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3501, *Matériaux de cure*.
 - .4 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3801, *Mortiers cimentaires en sac*.
 - .5 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3901, *Coulis cimentaires*.

CONCRETE FORMING AND ACCESSORIES

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Submit shop drawings for formwork and falsework.
 - .1 Submit drawings stamped and signed by professional engineer, member in good standing of the *Ordre des ingénieurs du Québec*.
 - .2 Shop drawings must indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, **special architectural exposed finishes**, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.
 - .3 Crowning wall formwork must have a minimum height of 200 mm higher than the height of the projected wall.
 - .4 Provide shop drawings including formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
 - .5 Provide sequence of erection and removal of formwork/falsework as directed by the Parks Canada Representative.
- .3 After construction, inspection and prior to the concrete pour, provide the Parks Canada Representative a written notice stating that the formwork and falsework conform to the drawings submitted. The notice must indicate the time and date of the inspection and be signed by an engineer, member in good standing of the *Ordre des ingénieurs du Québec*.
- .4 Submit the technical specifications with regards to the formwork and falsework.
 - .1 Provide the Parks Canada Representative all the technical specifications as well as the manufacturers documents concerning the formwork ties, form release agents and any other products required for the work of formwork and temporary support structures or falsework. The specifications must indicate the product characteristics, performance criteria, dimensions, limits and finish.
- .5 Specify the assembly and disassembly of the formwork and falsework in accordance to the Parks Canada Representatives requirements.
- .6 Submit required Material Safety Data Sheets (MSDS), in accordance with the Workplace Hazardous Materials Information System (WHMIS) and according to Section 01 35 29.06 – *Health and Safety Requirements* and Section 01 35 43 – *Environmental Procedures*.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert wood materials from landfill to a recycling reuse composting facility as approved by the Parks Canada Representative.

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- .4 Divert plastic materials from landfill to a recycling reuse composting facility as approved by the Parks Canada Representative.
- .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Parks Canada Representative.

Part 2 Products

2.1 MATERIALS

- .1 All exposed faces of the Chambly Canal crowning walls are elements with particular architectural features.
- .2 Formwork materials:
 - .1 Wood must be new. The surfaces and edges of the wood should be smooth, unbroken and the formwork joints must be minimized. The joints and the exposed face of the walls must be smooth and respect the particular architectural characteristics.
 - .2 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121
 - .3 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2 and the apparent surface must be smooth and free of defects.
 - .4 The surface of the formwork panels in contact with the cast-in-place concrete shall be covered with a formwork membrane compliant with the standard 31001 "Doublure de coffrage" of chapter 14 of Volume VII - Matériaux de la collection *Normes – Ouvrages routiers du Ministère des transports et de la mobilité durable du Québec (MTMDET)* to minimize the appearance of surface air bubbles. Formwork panels covered with a formwork membrane at the factory or on the jobsite must be protected from the weather and kept free of dirt, soil, paint and oil until the concrete pouring. The formwork membrane must also be kept dry and protected from splashing when existing adjacent concrete surface need to be wetted. The formwork membrane must respect the following points:
 - .1 The formwork membrane must not alter the appearance of the concrete surface. The Contractor's method of work must allow to harmonize the final color of the concrete surfaces with the ones without the formwork membrane;
 - .2 The formworks membrane must not adhere to the concrete surface and must be easily removed at the time of demolding;
 - .3 The formworks membrane must be designed to drain water from the concrete and block the passage of fine particles while avoiding clogging of the pores;
 - .4 The formworks membrane should only be used once;

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- .5 The formworks membrane must be clearly identified and the indications specific to its installation must be clearly indicated (Trademark and direction of installation, if applicable).
- .3 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
 - .3 For the special requirements of complete walls replacement, formwork ties are not permitted in the concrete of the walls to retain the vertical walls of the formwork. The tie rods must be located above the formwork or on the soles and removed after installation. Reinforcement parts must be installed on the exterior of the formwork to ensure structural integrity. For repair of the crowning walls workform ties are allowed.
 - .4 Concerning wall repairs, formwork ties are permitted.
 - .5 The ties and tie-rods end that remain in the concrete shall be galvanized.
- .4 Form stripping agent
 - .1 colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal 15 to 24 mm²/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .5 Falsework materials comply to CSA-S269.1, latest version.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .7 Unless otherwise specified and with approval for the Parks Canada Representative, use the same chamfer strips as the existing structure **on the top of the wall**.

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- .8 Visible and non-visible sharp edges shall be chamfered. Unless otherwise indicated in the specifications and drawing, the chamfer dimensions are use 15 mm x 15 mm.
- .9 Grooves, slots, openings, drip edges, re-entrants, and expansion and contraction joints must comply with specifications.
- .10 Embed anchors, sleeves, and other embedded items required for the works specified in other sections.
 - .1 Ensure that anchors and embeds do not protrude from surfaces to be coated with a finishing product, a coat of paint for example.
- .11 Coat the inside of the formwork with a commercially available form removal agent designed to prevent the adhesion of concrete.
- .12 Brush forms before their installation according to the application rate specified in the data sheet of the product to be used. The form removal agent should not come in contact with the reinforcement.
- .13 Determine the elevation of the concrete pour by the top of formwork or by molding.
- .14 Obtain authorization by the Parks Canada Representative prior to pouring concrete directly in the ground or when reserving openings in the formwork that aren't indicated in the drawings.
- .15 Before pouring concrete directly into the ground, lay the walls and bottom of the excavated area, and then remove any loose soil.
- .16 Before pouring the concrete, clean formwork in accordance with CSA standard A23.1/A23.2, latest edition.
 - .1 For cleaning formwork, use a compressed air jet, a jet of pressurized water, or a vacuum to remove any ice, snow, debris, or other foreign matter.
 - .2 The air jet must be equipped with a filter that removes oil. Demonstrate the effectiveness of the filter before use.
 - .3 Use mixing water for concrete in accordance with CSA standard A23.1/A23.2, latest edition, for cleaning formwork.

3.2 REMOVAL AND RESHORING

- .1 After pouring the concrete, leave the formwork in place for at least three (3) days.
- .2 Remove formwork when concrete has reached 70 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 The formwork shall be considered removed once it has been loosened and a part of it is no longer in contact with the concrete.
- .4 The requirements related to concrete cure must be applied in sequence with the formwork removal if the formwork is removed before the curing period, in accordance to Section 03 30 00 – *Cast in place concrete*.

**CONCRETE FORMING
AND ACCESSORIES**

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - *Cleaning*.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - *Cleaning*.

END OF SECTION

CONCRETE REINFORCING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 30 00 – Cast-In-Place Concrete.
- .3 Section 03 30 03 – Concrete Repair.

1.2 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66, ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A82/A82M, latest edition, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A143/A143M, latest edition, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M, latest edition, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .4 ASTM A775/A775M, latest edition, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 CSA International
 - .1 CSA-A23.1/A23.2, latest edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3, latest edition, Design of Concrete Structures.
 - .3 CSA-G30.18, latest edition, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21, latest edition, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164, latest edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186, latest edition, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, latest edition, Reinforcing Steel Manual of Standard Practice.
- .5 Ministère des Transports du Québec (MTQ)

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- .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*, latest edition.
- .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 5101, *Armatures pour les ouvrages de béton*, latest edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Submit drawings signed and sealed by professional engineer, member in good standing with the *Ordre des ingénieurs du Québec* (OIQ).
 - .2 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by the Parks Canada Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - .3 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
- .4 Submit rebar datasheets.
 - .1 Submit to the Parks Canada Representative, the required technical data sheets and the manufacturer's documentation for the wire mesh, galvanized touch-up, and any other necessary products. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits, and the finish.
- .5 Submit proposed supply of reinforcement materials to the Parks Canada Representative at least two (2) weeks before their delivery on site.
- .6 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review the Parks Canada Representative prior to its use.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – *Common Product Requirements* with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements

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- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements
 - .1 During transport and handling, cover all galvanized components to adequately protect them.
 - .2 Store materials off ground, indoors, in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .3 Replace defective or damaged materials with new.
- .4 Waste Management and Disposal
 - .1 Develop Construction Waste Management Plan related to the work of the present section and in accordance with Section 01 74 19 – *Waste Management and Disposal*.

Part 2 Products

2.1 MATERIALS

- .1 Steel bars:
 - .1 Reinforcing steel shall be galvanized.
 - .2 Ensure that reinforcing bars are free from dirt, earth, paint, splashes of hardened concrete from previous concrete pours, oil, and free of rust sheets on their surface.
 - .3 Ensure that reinforcing bars to be used are not deformed or twisted.
 - .4 Any replacement of reinforcing steel by different sized bars must be authorized in writing by the Parks Canada Representative.
 - .5 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
 - .6 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .2 Steel wire:
 - .1 Cold-drawn annealed steel wire ties: to ASTM standard A82/A82M.
 - .2 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.
 - .3 Steel wire used with galvanized reinforcing bars shall be galvanized.
- .3 Steel mesh:
 - .1 Mesh must be galvanized.
 - .2 Steel wire used with galvanized wire mesh must also be galvanized.

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- .3 Welded steel wire fabric to ASTM A185/A185M.
- .4 Welded deformed steel wire fabric comply to ASTM A82/A82M.
- .5 Provide in flat sheets only.
- .4 Galvanizing of non-prestressed reinforcement: minimum galvanization of 87 μm according to CAN/CSA-G164, latest edition, *Hot Dip Galvanizing of Irregularly Shaped Articles*.
- .5 Mechanical splices: subject to approval of the Parks Canada Representative.
- .6 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and with the *Reinforcing Steel Manual of Standard Practice* by the Reinforcing Steel Institute of Canada (RSIC).
- .2 Obtain Parks Canada Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Parks Canada Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .5 Apply tolerances for length and bending of reinforcing steel as specified in Figure 6.1 of the *RSIC Reinforcing Steel Manual of Standard Practice*.
- .6 Unless otherwise indicated on the drawings and specifications, apply a minimum length of 600 mm overlap between interconnecting bars following work carried out in several distinct phases.

2.3 SOURCE QUALITY CONTROL

- .1 Quality control: conform to Section 01 45 00 – *Quality Control*.
- .2 Upon request, provide Parks Canada Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum two (2) weeks prior to beginning reinforcing work.
- .3 Upon request, inform Parks Canada Representative of proposed source of material to be supplied.

CONCRETE REINFORCING

Part 3 Execution

3.1 PREPARATION

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by the Parks Canada Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
 - .1 Bending: cold bending by machine.
- .3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

- .1 Galvanized reinforcing bar:
 - .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
 - .2 Secure reinforcing steel using steel wire ties to prevent movement during the pouring of concrete:
 - .1 Attach firmly the reinforcing steel at intersections if these intersections are 300 mm or more away or at every two (2) intersections if distance is lesser.
 - .2 In the case of repair works, the reinforcing steel bars are fixed to the formwork ties.
 - .3 To link the reinforcing steel, use annealed steel wire with a diameter of at least 1.6 mm (16 gauge).
 - .4 Fold wires to obtain the same cover as required for reinforcement.
 - .5 Replace existing reinforcing steel whose ties have been altered during the demolition works in their original position. Attach the reinforcement to each formwork tie to meet the required concrete cover and a minimum distance of 25 mm between the reinforcing steel and the concrete to be conserved.
 - .3 Use plastic spacers spaced at a maximum distance of 1,200 mm from center to center, to maintain the reinforcing steel at the required distance from the forms, the ground, or the existing concrete:

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- .1 Use circular plastic spacers whose center is fixed to the reinforcing steel for holding in position the reinforcing steel grids comprising 15 M and 20 M bars.
- .2 Use plastic spacers to maintain upright the reinforcing steel grids comprising bars sized 25 M or larger.
- .3 Use continuous wedges with plastic coated wire and coated plastic tabs to keep horizontal the reinforcing steel grid which is closest to the formwork, the ground, or the existing concrete.
- .4 Unless otherwise indicated in the drawings and specifications, use individual plastic spacers for the horizontal reinforcing steel.
- .4 During repair work, at the request of the Parks Canada Representative, add reinforcement if corrosion has thinned the existing reinforcing steel bars enough to reduce the structural capacity of the structure.
 - .1 Install this additional reinforcement to obtain a minimum overlap of 600 mm.
 - .2 If required, demolish concrete to respect this requirement.
- .5 Steel mesh
 - .1 The mesh shall be free of dirt, dirt, paint, rust, hardened concrete splash from previous sprayed concrete placement, oil and shall not be deformed or twisted.
 - .2 The mesh shall be securely fixed in the concrete, using mechanically anchored ties or securely attached to existing reinforcements, to avoid displacement when placing the concrete.
 - .3 Steel wire used to bond wire mesh shall be of annealed steel and shall have a diameter no less than 1.6 mm (16 gauge). The steel wire used with galvanized wire mesh must be galvanized. The steel wires shall be folded in such a way as to have the same coating as that required for the lattices they fix.
 - .4 Existing rebar whose fasteners have been altered by demolition work shall be returned to their original position and secured by steel wire tie to each grid anchor.
 - .5 The mesh shall be spaced at least 25 mm from the surface to be covered and shall have a minimum coating of 30 mm. The mesh must overlap a minimum distance of 150 mm.
- .6 Prior to pouring concrete, obtain Parks Canada Representative's approval of reinforcing material and placement.
- .7 Ensure that the integrity of the reinforcement coating is preserved during concrete pouring.

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REINFORCING**

3.4 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – *Cleaning*.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.

END OF SECTION

**CAST-IN-PLACE
CONCRETE**

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing.
- .3 Section 03 30 03 – Concrete Repair.

1.2 Abbreviations and Acronyms

- .1 Portland Cement : hydraulic cement, blended hydraulic cement (b suffix - b denotes blended) and Portland-limestone cement.
 - .1 Type GU, GUb and GUL - General use cement.
 - .2 Type MS and MSb - Moderate sulphate-resistant cement.
 - .3 Type MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 Type HE, HEb and HEL - High early-strength cement.
 - .5 Type LH, LHb and LHL - Low heat of hydration cement.
 - .6 Type HS and HSb - High sulphate-resistant cement.
- .2 Fly ash:
 - .1 Type F - with CaO content less than 15 %.
 - .2 Type CI - with CaO content ranging from 15 to 20 %.
 - .3 Type CH - with CaO greater than 20 %.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.3 REFERENCES

- .1 Use the latest version of the following references
- .2 ASTM International
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .5 ASTM D412-06a (2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

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- .6 ASTM D624-00 (2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .7 ASTM D1751-04 (2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .8 ASTM D1752-04a (2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .3 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 Standard (Quebec)
 - .1 Tome VII (2017) Matériaux; Direction des normes et des documents d'ingénierie du Ministère des Transports, de la Mobilité durable et de l'Électrification des Transports (MTMDET)
- .5 Ministry of Transport of Quebec:
 - .1 Liste des matériaux relatifs au béton éprouvés par le laboratoire des chaussées, dernière édition.
 - .2 Cahier des charges et devis généraux, Infrastructures routières, Construction et réparation, dernière édition, Gouvernement du Québec.
 - .3 Normes Ouvrages routiers, Tome VII, Matériaux, Gouvernement du Québec, dernière édition.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: one-week (1) prior to the concrete work, convene a meeting in accordance with Section 01 32 16.19 - *Construction Progress Schedules - Bar (GANTT) Chart* and Section 01 31 19 - *Project Meetings*.
 - .1 The Parks Canada Representative and a representative of the testing laboratory must be present.
 - .1 Verify project requirements (constraints, particular conditions, etc.)
 - .2 Examine concrete pouring procedure.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

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- .2 Testing inspection and follow-up register
 - .1 Provide testing inspection results reports for review by the Parks Canada Representative and do not proceed without written approval when deviations from mix design or parameters are found.
 - .3 Supply **concrete pouring procedure**
 - .1 Provide the concrete pouring procedures to the Parks Canada Representative for approval. This procedure shall describe the proposed methods of work and the proposed methods for the quality control (Quality management plan).
 - .4 Supply **technical specifications and descriptions sheets**
 - .1 Submit the required technical and/or descriptive data sheets as well as the manufacturer's documentation of the concrete type, concrete mixing equipment and any other products or equipment required for concreting to the Parks Canada Representative. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits, and the finish.
 - .5 **Batch of concrete registry**
 - .1 Provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature, and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
 - .6 **Concreting Notice**
 - .1 Submit, in writing, a concreting notice at least twenty-four (24) hours prior to commencement of concreting to the Parks Canada Representative.
 - .7 **Concrete hauling time**
 - .1 Provide for review by Parks Canada Representative DCC Representative Government Representative deviations exceeding maximum allowable time of one hundred and twenty (120) minutes for concrete to be delivered to site of Work and discharged after batching.
- 1.6 QUALITY ASSURANCE**
- .1 Quality Assurance: in accordance with Section 01 45 00 - *Quality Control*.
 - .2 Provide the Parks Canada Representative, **minimum two (2) weeks prior to starting concrete work**, with a valid and recognized certificate from the plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

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- .3 **Minimum two (2) weeks prior to starting concrete work**, provide proposed quality control procedures for review by Parks Canada Representative DCC Representative Government Representative on following items:
- .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
 - .8 Bad meteorological conditions.
- .4 Quality Control Plan: provide written report to the Parks Canada Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle all materials in accordance to Section 01 61 00 – *Common product requirements* and manufacturing instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Transport Time: Concrete shall be delivered to the site and discharged to the maximum within one hundred and twenty (120) minutes of mixing.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from the Parks Canada Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Variances must be submitted to the Parks Canada Representative for review.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Packaging Waste Management
 - .1 Remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.

1.8 SITE CONDITIONS

- .1 Place concrete while complying with the temperature limits in CAN/CSA-A23.1/A23.2.
 - .1 The contractor has to take the necessary actions to protect the concreted surfaces during unfavorable meteorological or field conditions. (Precipitation, wind excess or dust);

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- .2 The protection setup (shelter) must be approved by the Parks Canada Representative prior to the concrete pouring.
- .2 Comply with cold weather requirements when the air temperature drops below 5 degrees C or is forecast to drop below 5 degrees C in the 24 hours following the concreting.
- .3 Comply with the warm weather requirements when the air temperature is above 27 degrees C or is forecast to surpass 27 degrees C during concreting.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan
 - .1 Ensure concrete supplier meets performance criteria of concrete as established by the Parks Canada Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUb to CSA A3001.
- .3 Supplementary cementing materials : selon la norme CAN/CSA A3001 et selon les exigences suivantes :
 - .1 Remplacement minimal de 15 % de cendres volantes selon la masse des matériaux cimentaires au total.
 - .2 Minimum de 5 % de fumées de silice.
 - .3 Remplacement maximal de 30 % selon la masse des matériaux cimentaires au total.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Parks Canada Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

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- .7 Shrinkage compensating grout: premixed compound consisting of metallic non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
 - .1 Compressive strength: 35 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0.08 %.
- .8 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 35 MPa at 28 days.
- .9 Post-Tensioning Ducts: to CSA A23.1/A23.2.
- .10 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .11 Weep hole tubes: galvanized steel plastic.
- .12 Polyethylene film: 0.15 mm thickness to CAN/CGSB-51.34.
- .13 Self-adhesive membrane: according to the standard 3701 of Tome VII - Materials
- .14 Steel reinforcement placement compliant to Section 03 20 00 – *Concrete reinforcing*.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Workability: free of surface blemishes loss of mortar colour variations segregation.
 - .2 Air content for type V-S and XIV-R concrete meets requirements and is between 6 and 9%.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 age: 35 MPa minimum.
 - .3 Intended application : repair work and barriers.
 - .4 Aggregate size: 22 mm maximum.
 - .5 Pre-Qualification: air-entraining agent, slump, and temperature results based on the previous use of the proposed mixture.
 - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .5 Certification du fournisseur de béton : la centrale de malaxage et les matériaux doivent satisfaire aux exigences de la norme CAN/CSA A23.1.

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Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Require a delivery slip for each concrete load from the concrete supplier and submit a copy of the slip to the Parks Canada Representative after each pour. The following information should appear on the slip:
 - .1 Supplier name and address
 - .2 Truck Number
 - .3 Name of Contractor
 - .4 Designation and Location of the Project
 - .5 Concrete class
 - .6 Cumulative Quantity
 - .7 Beginning of unloading
 - .8 End of unloading
 - .9 Maximum aggregate size
 - .10 Air Required
 - .11 Types of Adjuvants Used
 - .12 Quantity and type of cement
 - .13 Water quantity.
- .2 Site tests (on field, in laboratory and/or in factory)
 - .1 Conduct tests as follows in accordance with Section 01 45 00 - *Quality Control* and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete batch
 - .2 Slump
 - .3 Air content
 - .4 Compressive strength at 7 and 28 days
 - .5 Air temperature
 - .6 Test registry
 - .2 The precontrol of the concrete shall be performed by the Contractor's laboratory to the satisfaction of the Parks Canada Representative in accordance with CAN/CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CAN/CSA A283.
 - .3 The testing laboratory will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
 - .4 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

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3.2 PREPARATION

- .1 Obtain Parks Canada Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - *Concrete Reinforcing*.
- .3 During concreting operations
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete will not be permitted is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain Parks Canada Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate **records of poured concrete items** to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout epoxy grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Parks Canada Representative.
- .12 Immediately before placing concrete, properly water the substrate with clean water.

3.3 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts
 - .1 Do not install any sleeves, ducts or pipes and do not cut any openings through a joist, beam, column cap or column unless indicated or authorized by the Parks Canada Representative.
 - .2 Where approved by the Parks Canada Representative, set sleeve, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated must be reviewed by the Parks Canada Representative.

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- .4 If inserts cannot be located as specified, obtain written approval of modifications from the Parks Canada Representative before placing of concrete.
 - .5 The contractor must provide position conflict possibility with cast in place elements during installation of rebars as bollards, rungs et all others elements cast in place.
 - .6 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .7 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts
- .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from the Parks Canada Representative.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 The diameter of the drilled holes after the concrete has set must comply with the manufacturer's recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with shrinkage compensating grout epoxy grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
- .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - *Concrete Forming and Accessories*. If wood forms are used, remove them after concrete has set.
 - .2 Install weep hole tubes and drains as indicated.
- .5 Finishing and curing:
- .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures as reviewed by the Government Representative to remove excess bleed water. Ensure surface is not damaged.
 - .3 Finishing:
 - .1 Top of crowning wall: rough finishing as existing;
 - .2 Canal side vertical wall – Architectural finishing required (must be smooth)
 - .3 Approach Slabs: Rough Finish ;
 - .4 Anywhere else: Smooth finishing;
 - .5 Sidewalks: brushed finish (if required).
- .6 Joint fillers:

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- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the Parks Canada Representative.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form isolation construction expansion joints as indicated.
 - .4 Install joint filler.
- .7 Crack initiation
- .1 Saw cut required by drawings shall be carried out as soon as feasible without loosening aggregates or causing spalling when the concrete has begun to harden, but before the stresses produced by shrinkage have caused irregular cracks.
 - .2 Saw cut shall be rectilinear. It shall not deviate by more than 6 mm over a length of 3 m. Immediately after sawing, the groove produced, and the surface of the concrete lining must be cleaned of any sawdust or debris.
 - .3 Anticipate the preparation, supply and treatment of cracks in order to make an injection over an additional 30 meters for any type of cracks on the concrete. This Intervention Length does not include the repair of cracks greater than the value indicated in the tolerance section under the responsibility of the Contractor

3.4 SURFACE TOLERANCE

- .1 Ensure surfaces are smooth, continuous and uniform. Ensure exposed face of wall is free of cavities.
- .2 The formworks joints must not be visible (the surface must be smooth)
- .3 Cracks with a width greater than 0.8mm must be repaired and injected according to activity 3106 - Crack Filling, of the Structures Maintenance Manual, Gouvernement du Québec, latest edition.

3.5 CAST-IN-PLACE CONCRETE CURING

- .1 The concrete cure installed must be done so in accordance with the following requirements in addition to the curing requirements of CAN / CSA-A23.1 / A23.2.
- .2 Cure of non-enclosed concrete surfaces: Absorbent water-absorbent cloth
 - .1 Install water-saturated synthetic fiber webs on sufficiently hardened concrete surfaces to prevent surface damage and then cover with impermeable sheets to maintain moisture on the surface of the concrete.
 - .2 Overlap each sheet by a minimum of 75 mm and secure against wind movement.
 - .3 Maintain absorbent webs in place and keep them moist so that there is a thin layer of water on the surface of the concrete throughout the cure, for a period of seven (7) calendar days thereafter concreting.
- .3 Concrete surface curing :

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- .1 No additional curing is required if the formwork is left in place for seven (7) consecutive days or more.
- .2 If the formwork is removed within seven (7) consecutive days, wetted water-absorbent cloths or membrane curing materials shall be applied immediately to the stripped surfaces, to the satisfaction of the Parks Canada Representative and maintained for a seven (7) consecutive day period in accordance with Section 03 10 00 - *Concrete Form and Accessories*.
- .4 During the curing period, only the areas requiring finishing treatment can be uncovered. All other surfaces shall remain covered.

3.6 PROTECTION

- .1 Concrete work in Tome VII (MTQ) may be carried out in cold weather and may require shelter, heating, or thermal insulation.
- .2 The temperature of the plastic concrete at the time of installation shall comply with the requirements of Standard 3101 of the Ministère des Transports du Québec as set out in Annex 1, (Tome VII, MTQ), chapter 3, section 3.1 Concrete, Standard 3101, *normal density concrete*.
- .3 Assume the heating of the shelter to comply with the requirements of this section and with the requirements of CSA Standard A23.1 / A23.2, Constituents and performance of work/test methods and standardized practices for concrete, relative to the temperatures of the materials adjacent to the repairs during the concreting, to the constituents of the concrete and to the temperature during curing.
- .4 Maintain a minimum temperature of 10 ° C on concrete surfaces for a minimum of seven (7) consecutive days following concreting.
 - .1 Extend protection period until concrete reaches 70% of required compressive strength at twenty-eight (28) days.
- .5 After the protection period, lower the concrete temperature gradually for the first twenty-four (24) hours.
 - .1 The rate of decrease in temperature shall not exceed 10 ° C / hour.
 - .2 Do not allow concrete to encounter exterior air if the temperature if the difference between the concrete and the outside air is greater than 20 ° C.
- .6 Concrete curing requirements apply regardless of the type of protection installed.
- .7 Any concrete that has frozen is not paid and is rejected. The part of the structure constructed with this concrete is deemed to be defective and must be reconstructed per the plans and specifications at the Contractor's cost.
- .8 Existing concrete, frames and formwork
 - .1 The use of sodium chloride or calcium chloride as a de-icing agent is prohibited.

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- .2 In the case of open air concreting, all surfaces (existing concrete, reinforcement, formwork, etc.) with which the plastic concrete comes into contact must be pre-heated to a minimum temperature of 5 ° C until concreting.
- .9 In the case of concreting under cover, heat and maintain the contact surfaces at a temperature between 5 ° C and 20 ° C for a period of at least 24 hours prior to concreting.
- .10 Keep shuttering in place for the entire duration of protection and maintain enclosed areas at a temperature of 5 ° C and 20 ° C for
- .11 Types of protection
 - .1 Insulation
 - .1 Use an insulating material to cover the surface of plastic concrete.
 - .1 Each layer of insulating material shall be of the waterproof cover type made from a closed cell foam plate and have an RSI thermal resistance of 0.40.
 - .2 On the day before concreting, have the Parks Canada Representative approve the number of layers of insulating material to be laid.
 - .1 Depending on the temperature of the concrete during the protection period, the Parks Canada Representative may require to reduce or increase the number of layers; the removal or addition of a layer shall be completed within three (3) hours following the Parks Canada Representative's request.
 - .3 Ensure insulation is installed in such a way that it prevents exposure of concrete surfaces to outside air throughout the duration of protection.
 - .4 Seams of insulating covers shall have an overlap of at least 75 mm.
 - .5 Insulation shall be paid to the insulation item.
 - .2 Temporary Shelters
 - .1 Build protective shelters to enclose structures.
 - .2 Prepare and submit the plan for the construction of the protective shelter at least two (2) weeks prior to commencing concreting under these shelters.
 - .3 Make the shelter to cover the surfaces of the work to be concreted with canvas and tarpaulins.
 - .1 These covers shall be leakproof, resistant and secured so as not to be moved during the period of protection.
 - .4 Ensure that the shelter is of sufficient height and size to allow indoor placement, concrete placement (cast or cast), concrete finish and curing.
 - .5 Shelter shall be paid to the temporary shelter item.

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

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- .1 Keep the area clean at the end of each workday.
- .2 Final cleaning: Evacuate surplus materials / materials, waste, tools, and equipment from the site in accordance to section 01 74 11 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
 - .1 Prepare a Waste Reduction Workplan (WRW) according to Section 01 74 21 – *Construction/Demolition Waste Management and Disposal*.
 - .2 Divert unused concrete materials from landfill to local quarry facility after receipt of written approval from the Parks Canada Representative.
 - .3 Remove bins and recycling trolleys from site and dispose of materials at appropriate facilities.
 - .4 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .5 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Parks Canada Representative.
 - .6 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .8 Using appropriate safety precautions, collect liquid, or solidify liquid with inert, non-combustible material and remove for disposal.
 - .9 Dispose of waste in accordance with applicable local, Provincial/Territorial, and National regulations.

END OF SECTION

CONCRETE REPAIR

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition - Minor Works.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 30 00 – Cast-in-place Concrete.

1.2 REFERENCES

- .1 Unless otherwise indicated, execute all concrete repair works in accordance with the requirements of the following standards:
 - .1 CSA International:
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-269.1-1975 (R1998), Falsework for Construction Purposes.
 - .3 CAN/CSA-S269.3-M92 (R2013), Concrete Formwork.
 - .4 CAN/CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .5 CAN/CSA G30.3-M1983 (R1998), Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .6 CAN/CSA-G30.5-M1983 (R1998), Welded Steel Wire Fabric for Concrete Reinforcement.
 - .7 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .2 American Concrete Institute:
 - .1 ACI 304.2R-96, Placing Concrete by Pumping Methods.
 - .2 ACI 546.1.R-80, Guide to Repair of Concrete Bridge Superstructures.
 - .3 ASTM International
 - .1 ASTM E488/E488M-10, Standard Test Methods for Strength of Anchors in Concrete Elements.
 - .4 Ministère des Transports du Québec :
 - .1 Liste des matériaux relatifs au béton éprouvés par le laboratoire des chaussées, 2012.
 - .2 Cahier des charges et devis généraux, Infrastructures routières, Construction et réparation, Édition 2013, Gouvernement du Québec.
 - .3 Normes Ouvrages routiers, Tome VII, Matériaux, Gouvernement du Québec.

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- .4 Manuel d'entretien des structures, Gouvernement du Québec, dernière édition.

1.3 DOCUMENTS/SAMPLES REQUIRED

- .1 Submit the documents and samples required under section 01 33 00, *Documents and Samples*.
- .2 Shop Drawings
 - .1 Submit to the Parks Canada Representative, for inspection, the required shop drawings, signed by a qualified engineer, a member of the *Ordre des ingénieurs du Québec*. The drawings shall illustrate the proposed work method.
- .3 Submit Technical and Descriptive Sheets
 - .1 Submit to the Parks Canada Representative the required technical and / or descriptive data sheets and the manufacturer's documentation for concrete repair work. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits, and the finish.
- .4 Submit work procedure, shop drawings, technical specifications, and other demolition documents in accordance with Section 02 41 00.08 - Demolition for minor works.
- .5 Submit work procedure, shop drawings, technical specifications and any other documents relating to concrete formwork, in accordance with Section 03 10 00 - *Concrete Forms and Accessories*.
- .6 Submit work procedure, shop drawings, technical specifications and other documents relating to the work of the reinforcement laying, in accordance with Section 03 20 00 - *Concrete Reinforcing*.
- .7 Submit work procedure, shop drawings, technical specifications and any other documents relating to in-place concrete work in accordance with Section 03 30 00 – *Cast-in-place Concrete*.
- .8 Submit procedure for crack injection.
 - .1 Provide a work plan for the injection of the cracks, including a detailed description of the products and the proposed injection method to the Parks Canada Representative. Include technical data sheets of the products and materials, the make and model number of the pressure gauge, including a certificate of calibration dated no more than twelve (12) months prior to the date of the repair works.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with section 01 45 00 – *Quality Control*.
- .2 For demolition work refer to Section 02 41 00.08 – *Demolition for minor works*.

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- .3 For concrete forming work refer to Section 03 10 00 - *Concrete forming and accessories*.
- .4 For rebar work refer to Section 03 20 00 – *Concrete reinforcing*.
- .5 For concrete work refer to Section 03 30 00 – *Cast-in-place concrete*.
- .6 Chemical Anchors:
 - .1 Before beginning the installation of chemical anchoring, install three (3) dowels for chemical anchors in areas designated by the Parks Canada Representative.
 - .2 Perform pull tests on the dowels in accordance with ASTM E488 in the presence of the Parks Canada Representative.
 - .3 If the pullout capacity of the dowels is less than the elastic limit shown on the plans, modify the anchoring method and redo the dowel pull tests on new dowels.
 - .4 Repair all concrete surfaces damaged during the pull tests.

1.5 SITE CONDITIONS

- .1 For demolition work refer to Section 02 41 00.08 – *Demolition for minor works*.
- .2 For formwork refer to Section 03 10 00 – *Concrete forming and accessories*.
- .3 For reinforcement bar placement refer to Section 03 20 00 – *Concrete reinforcing*.
- .4 For cast-in-place concrete refer to Section 03 30 00 - *Cast-in-place concrete*.
- .5 Crack injection should not be performed when the concrete temperature is lower than 15 °C or above 30 °C.

1.6 TRANSPORT, STORAGE, AND HANDLING

- .1 For demolition work refer to Section 02 41 00.08 – *Demolition for minor works*.
- .2 For formwork refer to Section 03 10 00 – *Concrete forming and accessories*.
- .3 For reinforcement bar placement refer to Section 03 20 00 – *Concrete reinforcing*.
- .4 For cast-in-place concrete refer to Section 03 30 00 – *Cast-in-place concrete*.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 For demolition work refer to Section 02 41 00.08 – *Demolition for minor works*.
- .2 For formwork refer to Section 03 10 00 – *Concrete forming and accessories*.
- .3 For cast-in-place concrete refer to Section 03 30 00 – *Cast-in-place concrete*.
- .4 Grout
 - .1 Portland cement: to CAN/CSA-A3000 standard, GU type.

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- .2 Water: to CSA-A23.1.
- .3 Aggregates: to CSA-A23.1/A23.2.
- .4 Dry Unmixed Grout: product containing Portland cement with non-metallic aggregate and sufficient water to be able to hold its shape when made into a ball with one's hands, and able to reach a compressive strength of 35 MPa in 28 days.
- .5 Binding Agent (adhesive):
 - .1 Binding agent (adhesive) on the surface of existing concrete before pouring: slurry composed of latex, cement, and water mixed in the following proportions:
 - .1 3 kg of cement, GU type
 - .2 7.5 liters of latex
 - .3 About 2.5 liters of water to obtain a creamy consistency.
- .6 Chemical Anchors:
 - .1 Provide dowels in accordance to Section 03 20 00- *Concrete reinforcing*.
 - .2 Use a two-component injectable adhesive for installation of all reinforcing dowels in the existing concrete.
 - .3 Use only recommended distributors and mixing nozzles.
 - .4 Included in the "Dowel Adhesives" list of the "Designated Sources for Materials" document published by the Ministry of Transportation of Ontario and available on "The Road Authority" website.

Part 3 Execution

3.1 GENERALITIES

- .1 Before commencing work, the Parks Canada Representative will determine and delineate, in the presence of the Contractor, the concrete to be demolished.
- .2 Provide the Parks Canada Representative with all necessary safety equipment to allow him/her to identify the areas to be demolished and to inspect the affected surfaces.
- .3 Remove and replace any damaged or defective concrete by concrete that meets the requirements of the plans and specifications and as directed by the Parks Canada Representative.
- .4 Following the removal of formwork, the Parks Canada Representative shall examine voids, honeycomb cracking and other defects. Submit repair procedures for voids, honeycomb cracking or other defects, if applicable, to the Parks Canada Representative for approval. Do not perform surface corrections until authorized by the Parks Canada Representative.
- .5 Carry out work in accordance with Section 01 35 43 – *Environmental procedures*.

CONCRETE REPAIR

3.2 CONCRETE DEMOLITION

- .1 Carry out work in accordance with Section 02 41 00.08 – *Demolition for minor works.*

3.3 REBARS/DOWELS

- .1 Carry out work in accordance with Section 03 20 00 – *Concrete reinforcing.*

3.4 CHEMICAL ANCHORS

- .1 Unless otherwise indicated in the plans and specifications, the drill hole characteristics for anchoring are as follows:
 - .1 Drill holes to depths required by the manufacturer of the chemical anchoring adhesive for the elastic limit set out plans for a concrete of 35 MPa.
 - .2 Minimum depth of all drill holes for anchors : 200 mm.
 - .3 Drill holes on vertical surfaces inclined at 15 ° to the horizontal, below the orifice.
- .2 Brush holes to a clean state and blow using a compressed air jet just before the injection of the chemical anchoring adhesive. Insert the air jet hose to the bottom of the hole.
- .3 Inject the chemical anchoring adhesive in the hole. Inject an amount sufficient to completely fill the space between the dowel and the hole over the entire length of the hole.
- .4 Insert a clean dowel free of any grease into the bottom of the hole.
- .5 Prevent disturbance of the dowel during the curing period.

3.5 SURFACE PREPARATION

- .1 The exposed surfaces shall be clean and free from loose and friable particles in accordance with Section 02 41 00.08 – *Demolition for minor works.*
- .2 The Parks Canada Representative shall approve the exposed surfaces before the beginning of the pouring of concrete.
- .3 Keep the surfaces wet for a period of at least 8 hours before the pouring of the concrete and remove all accumulations of water. Surfaces must be superficially dry before the pour.

3.6 BONDING AGENT APPLICATION

- .1 On the areas required by the Departmental Representative, the bond between the old and new concrete must be improved by the application of the described bonding agent. If the bonding agent is dry at the moment of the pour, the surface must be cleaned again with a water jet and a new coat of bonding agent must be applied.

CONCRETE REPAIR

3.7 REPAIR WITHOUT OVERLAY (type 1 and 3)

- .1 Carry out demolition work in accordance with Section 02 41 00.08 - *Demolition for minor works*. and the following indications:
 - .1 Unless otherwise specified, concrete surfaces to be repaired with formwork without overlay shall be demolished to a minimum depth of one hundred twenty-five (125) mm; All non-sound concrete located beyond this depth shall be removed. The exposed frame shall have a twenty-five (25) mm clearance.
 - .2 The Contractor must advise the Parks Canada Representative, in written form, if a demolition of more than one hundred twenty-five (125) mm is required.
- .2 Perform shuttering and concrete work in accordance with Sections 03 10 00 - *Concrete Forms and Accessories*, 03 30 00 - *Cast-in-Place Concrete* and the following:
- .3 Provide XIV-R type concrete (35 MPa) in accordance with the plans and specifications of Standard 3101 "Normal Density Concrete" of the Ministère des Transports du Québec.
- .4 During the period between October 15 and March 31, the ternary binder is prohibited.
- .5 Carry out reinforcement work in accordance with Section 03 20 00 - *Concrete reinforcement* and anchorage in accordance with sub section 3 of the present Section.
- .6 Ensure that the exposed face of the wall (channel side) is free of cavities.

3.8 REPAIR WITH OVERLAY (type 2)

- .1 Carry out demolition work in accordance with Section 02 41 00.08 - *Demolition for minor works*. and the following indications:
 - .1 Unless otherwise specified, concrete surfaces to be repaired with formwork with overlay shall be demolished to a minimum depth of ten (10) mm.
 - .2 The Contractor must advise the Parks Canada Representative, in written form, if a demolition of more than 10 (10) mm is required.
- .2 Perform shuttering and concrete work in accordance with Sections 03 10 00 - *Concrete Forms and Accessories*, 03 30 00 - *Cast-in-Place Concrete* and the following:
- .3 Provide V-S type concrete (35 MPa) in accordance with the plans and specifications of Standard 3101 "Normal Density Concrete" of the Ministère des Transports du Québec.
- .4 During the period between October 15 and March 31, the ternary binder is prohibited.
- .5 Carry out reinforcement work in accordance with Section 03 20 00 - *Concrete reinforcement* and anchorage in accordance with sub section 3 of the present Section.
- .6 Ensure that the exposed face of the wall (channel side) is free of cavities.

CONCRETE REPAIR

3.9 CONCRETE FABRICATION

- .1 Carry out cast-in-place concreting work in accordance with Section 03 30 00 - *Cast-in-place concrete*.
- .2 Provide appropriate concrete for different types of repair and reconstruction (35 MPa) in accordance with the plans and specifications of Standard 3101 "Normal Mass Concrete" of the Ministère des Transports du Québec
- .3 For each load of concrete, the concrete supplier must provide the Parks Canada Representative with a copy of the delivery slip. The following information will appear on the slip:
 - .1 Company name and address of the supplier
 - .2 Truck number
 - .3 Name of the Contractor
 - .4 Name and location of project
 - .5 Concrete class
 - .6 Cumulative quantity
 - .7 Unloading start time
 - .8 Unloading end time
 - .9 Maximum size of aggregate
 - .10 Required air content
 - .11 Types of additives used
 - .12 Amount and type of cement
 - .13 Amount of water.
- .4 Comply with indications of section 20 of CSA-A23.1-M90 standard regarding construction joints. Execute shear keys on the entire length of any construction joint. Those keys shall have a width equal to one-third of the section thickness and a depth equal to one-sixth of that thickness, to a maximum of one hundred (100) mm. Slightly bevel sides of shear keys.
- .5 Element finishing, in accordance with Section 03 30 00 - *Cast-in-place concrete*.
- .6 Element curing, in accordance with Section 03 30 00 - *Cast-in-place concrete*.

3.10 WINTER CONDITIONS

- .1 Carry out work in accordance with Section 03 30 00 - *Cast-in-place concrete*

3.11 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Keep the area clean at the end of each workday.

CONCRETE REPAIR

- .2 Final cleaning: Evacuate surplus materials / materials, waste, tools, and equipment from the site in accordance to section 01 74 11 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
 - .1 Prepare a Waste Reduction Workplan (WRW) according to Section 01 74 21 – *Construction/Demolition Waste Management and Disposal*.
 - .2 Divert unused concrete materials from landfill to local quarry facility after receipt of written approval from the Departmental Representative.
 - .3 Remove bins and recycling trolleys from site and dispose of materials at appropriate facilities.
 - .4 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .5 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Departmental Representative.
 - .6 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .8 Using appropriate safety precautions, collect liquid, or solidify liquid with inert, non-combustible material and remove for disposal.
 - .9 Dispose of waste in accordance with applicable local, Provincial/Territorial, and National regulations.

END OF SECTION

**PAINTING -
MINOR WORKS**

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections of the Division 01 – *General Requirements*.

1.2 REFERENCES

- .1 The Master Painters Institute (MPI)
- .1 Exterior Structural Steel and Metal Fabrications, 07.
 - .1 EXT 5.1D, Alkyd.
 - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
 - .3 EXT 5.4, Aluminum.
 - .2 Federal Standard (FS)
 - .1 FED-STD-595B-89, Colours Used in Government Procurement.
 - .3 The Society for Protective Coatings (SSPC)
 - .1 SSPC-SP 1 - last edition, Solvent Cleaning.
 - .2 SSPC-SP 2- last edition, Hand Tool Cleaning.
 - .3 SSPC-SP 3- last edition, Power Tool Cleaning.
 - .4 SSPC-SP 6/NACE No. 3- last edition, Commercial Blast Cleaning.
 - .5 SSPC-SP 7/NACE No. 4- last edition, Brush-off Blast Cleaning.
 - .6 SSPC-SP 10/NACE No. 2- last edition, Near White Blast Cleaning.
 - .7 SSPC-PA 2- last edition, Measurement of Dry Coat Thickness with Magnetic Gauges.
 - .8 SSPC Good Painting Practices, Volume 1, 4th Edition.
 - .9 SSPC-Vis-1- last edition, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).
 - .4 Ministère des Transports du Québec :
 - .1 Cahier des charges et devis généraux – *Infrastructures routières – Construction et réparation*
 - .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 10102, *Peintures et système de peintures à base de zinc pour structures d'acier*.
 - .3 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 10103, *Peintures et systèmes de peinture organiques pour structures d'acier*.

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- .4 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 10104, *Systèmes de peintures pour structures d'acier.*
- .5 Direction des structures, *Guide peinture des charpentes métalliques.*

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - *Health and Safety Requirements* and 01 35 43 - *Environmental Procedures.*
- .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Submit color samples for paint selection to the Parks Canada Representative at least fifteen **(15) working days** prior to commencement of work. These paint samples will allow the Parks Canada Representative to choose the color.
 - .3 Submit black color samples.. Color sample shall be presented on a small steel tubular part of the guard rail, length of three hundred (300) mm.
 - .4 Incorporate the color of the approved sample into the color of the finish coat of the selected paint system.
 - .5 Select paint systems as described in Part 2 of this section of the specifications.
- .4 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports:
 - .1 Submit test reports showing compliance with specified performance characteristics and physical properties and in accordance with Section 01 45 00 - *Quality Control.*
 - .2 Ensure that the test report contains the following information:
 - .1 Title and date of report.
 - .2 Non-volatile matter content (% by mass) according to ASTM D2369, Standard Test Method for Volatile Content of Coating.
 - .3 Pigment content (% by mass) according to ASTM D2371, Standard Test Method for Pigment Content of Solvent Reducible Paints.
 - .4 Density (kg / l) according to ASTM D1475, Standard Test Method for Density of Liquid Coating, Inks and Related Products.

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- .5 Consistency (Stormer) (K.U.) according to the requirements of ASTM D572, Standard Test Method for Consistency of Paints Measuring Krebs Units (KU) Viscosity Using a Stormer Type Viscometer.
- .3 Verify conformity of test results by reference to the approval values shown on the approval lists for paint systems. A tolerance is associated with each value of the approval.
- .4 As an additional verification, if required, provide the Parks Canada Representative with infrared spectra of the components of this paint according to the requirements of ASTM D2621, Standard Test Method for Infrared Identification of Vehicle Solids from Solvent Reducible Paints.
- .5 Submit the waste management plan in accordance with Section 01 74 19 - *Waste Management and Disposal*.

1.4 QUALITY ASSURANCE

- .1 For each delivery of paint, the Contractor shall provide the Parks Canada Representative with a certificate of compliance containing the following information for each production lot:
 - .1 Name of paint manufacturer;
 - .2 The name of the painting;
 - .3 Production lot number.
 - .4 A production batch corresponds to a tank number. In the case of zinc powder, a production batch corresponds to a manufacturer code.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - *Common Product Requirements* and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Materials must be stored in a heated container at the temperature recommended by the supplier, but no less than 10 ° C.
- .4 Packaging Waste Management: remove for reuse of pallets, crates, padding, packaging materials as specified in Section 01 74 19 - *Waste Management and Disposal*.

PAINTING - MINOR WORKS

Part 2 Products

2.1 MATERIALS

- .1 Surfaces that need painting must be covered by the following painting system or equivalent approved by the ParksCanada Representative:
 - .1 Base coat: Carbomastic 615 AL
 - .2 Second coat: Carboguard 890 LT Black C900
 - .3 Finishing coat: Carboguard 8815 Black C900
- .2 Execute de finishing coat (Color) on railing rails after installation.
- .3 Provide paint system application on anchor elements (threaded rods and bolts) of railing posts after final tightening.
- .4 Consider the finish coat to be the color of the paint sample approved by the Parks Canada Representative.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Parks Canada Representative.

3.2 PREPARATION

- .1 Prior to repairing and/or replacing steel structure components and inspection, remove existing metallic paint, rust or corrosion particles from the steel surfaces as indicated below.
- .2 New metal surfaces:
 - .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:
 - .1 Commercial blast cleaning: to SSPC-SP 6.
 - .2 Solvent cleaning: to SSPC-SP 1.
 - .3 Hand tool cleaning: to SSPC-SP 2.
 - .4 Power tool cleaning: to SSPC-SP 3.
 - .5 Brush-off blast cleaning: to SSPC-SP 7.

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- .6 Near White Blast Cleaning: to SSPC-SP 10/NACE No. 2.
- .3 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-Visl.
 - .1 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.
 - .2 Clean surfaces again if rusting occurs after completion of surface preparation.
- .4 Mixing paint:
 - .1 Refer to chosen paint system manufacturer recommendations.
 - .2 Do not dilute or thin paint for brush application.
 - .3 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
 - .4 Do not mix or keep paint in suspension by means of air bubbling through paint.
 - .5 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Parks Canada Representative.
- .5 Number of paint coats
 - .1 For painting of metallic surfaces, apply the coats in accordance to the manufacturer's recommendations for the chosen paint system.

3.3 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Delay for applying the first coats: Apply a first coat of paint as soon as possible after surface preparation and before surface rust occurs to any surface cleaned, but not more than eight (8) hours when a zinc or high performance paint system approved in accordance with Standard 10102 or 10104 (Tome VII) of the Ministère des Transports du Québec is used, and twenty-four (24) hours in the case of an organic paint system or maintenance approved respectively according to standard 10102 or 10104 (Tome VII) of the Ministère des Transports du Québec.
- .3 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .4 Brush application:
 - .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers, or sheepskins.
 - .2 Brush out runs and sags.
 - .3 Remove runs, sags and brush marks from finished work and repaint.

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- .5 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
 - .3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
 - .5 Brush out immediately runs and sags.
 - .6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
 - .7 Remove runs, sags and brush marks from finished work and repaint.
- .6 Shop painting:
 - .1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.
 - .2 Do not paint metal surfaces which are to be embedded in concrete.
 - .3 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.
 - .4 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of approved primer or protective coating after shop fabrication is completed.
 - .5 Remove weld spatter before painting. Remove weld slag and flux by methods as specified in paragraph 3.2.3 Metal Surfaces to be Repainted.
 - .6 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating approved by the Parks Canada Representative.
 - .7 Report on the surfaces the mounting and mass marks masked by the painting in the workshop.
- .7 Handling painted metal:
 - .1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.
 - .2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

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3.4 QUALITY CONTROL

- .1 Site Tests, Inspections:
 - .1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.
 - .2 Submit dry film results to Parks Canada Representative.

3.5 PROTECTION

- .1 Protect painted surfaces from damage during construction.
- .2 Protection of surfaces:
 - .1 Protect surfaces not to receive paint.
 - .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .3 Protect cleaned and freshly painted surfaces from dust to approval of the Parks Canada Representative.
- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – *Cleaning*.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 32 19.16 – Soils stabilization with geotextile.
- .2 Section 32 91 21 – Topsoil Placement and Grading.
- .3 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 Use the last edition of the references hereafter:
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

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**EXCAVATING,
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1.3 DEFINITIONS

- .1 Excavation classes: two (2) classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: solid material in excess of 1.00 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than twenty-five (25) millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources, and engineered to meet requirements of fill areas are not allowed in this project
- .7 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
 - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
 - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Quality Control: in accordance with Section 01 45 00 - *Quality Control*.
- .1 Submit a **survey of existing conditions rapport** as described in *item 1.7 EXISTING CONDITIONS* of this Section.
- .2 Submit for review by the Parks Canada Representative proposed dewatering heave prevention methods as described in PART 3 of this Section.
- .3 Submit to the Parks Canada Representative written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.
- .4 Submit to the Parks Canada Representative written notice when bottom of excavation is reached.
- .5 Submit to the Parks Canada Representative testing inspection results report as described in PART 3 of this Section.
- .3 Documents and Workshop Drawings
- .1 Submit workshop drawings for excavation, cofferdam, trenching and backfilling work to the Parks Canada Representative for approval, signed by a qualified engineer, a member of the *Ordre des ingénieurs du Canada Québec*.
- .2 Prior to commencement of work, submit documentation with regards to the location of underground utilities.
- .4 Procedure
- .1 Submit to the Parks Canada Representative, for review, the procedure for storing excavation materials to be used for the backfill.
- .2 Submit to the Parks Canada Representative, for review, the procedure for preparing, presenting and correcting the cut and typical profile of excavation.
- .5 Technical Specifications
- .1 Before commencing the work referred to in this section, submit a list of the main equipment and materials
- .6 Samples:
- .1 Inform the Parks Canada Representative at least two (2) weeks prior to beginning Work, of proposed source of fill unshrinkable fill materials and provide access for sampling.
- .2 Ship samples prepaid to the Government Representative, in tightly closed containers to prevent contamination and exposure to elements.

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1.5 QUALITY ASSURANCE

- .1 Quality control: in accordance with Section 01 45 00 – *Quality Control*.
- .2 Qualification Statement: submit proof of insurance coverage for professional liability prior to commencing work

Materials testing and compaction testing shall be carried out by a Laboratory designated by the Contractor. A registry of all the essays must be provided by the Contractor.
- .3 No more than one (2) week prior to the commencement of backfilling or filling provide the designated testing organization with the descriptive records and grading of the proposed fill material for the work.
- .4 Notify the Parks Canada Representative in writing not later than forty-eight (48) hours prior to commencing backfilling or filling with the approved materials so that the designated testing laboratory can perform the necessary compaction tests.
- .5 Submit design and supporting data at least two (2) weeks prior to beginning Work.
- .6 Design and supporting data submitted to bear stamp and signature of qualified Professional Engineer, member of the *Ordre des ingénieurs du Québec*.
- .7 Retain the services of a recognized, competent engineer, member in good standing of the *Ordre des ingénieurs du Québec* (where the work will be performed) for the design and inspection of cofferdams, shoring works, bracing works, and underpinning works used during the performance of Work.
- .8 The Contractor must perform tests on excavated soils and submit a written report to validate the possibility of using the excavated soils. Do not use the excavated soils before receiving the official acceptance written notice of the report by the Parks Canada Representative.
- .9 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

1.7 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

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- .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, establish location and state of use of buried utilities and structures, notify the Parks Canada Representative, and clearly mark such locations to prevent disturbance to services during Work.
 - .6 Confirm locations of buried utilities by careful test excavations soil hydrovac methods.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .8 Record location of maintained, re-routed and abandoned underground lines.
 - .9 Confirm locations of recent excavations adjacent to area of excavation.
 - .10 Take a photographic and natural ground level survey.
- .2 Existing buildings and surface features:
- .1 Conduct, with the Parks Canada Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks monuments, various street furniture, street lamps (Concrete foundation, fixtures, and others) which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately undertake repairs as directed by the Departmental Representative at the Contractor's expense.
 - .3 If required for excavation work, cut roots or branches according to the section's 01 35 43 "Environmental procedures" and according to the Parks Canada Representative directions.

Part 2 Products

2.1 MATERIALS

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
 - .3 Table:

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-

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37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

- .2 Geotextiles: to Section 31 32 19.16 – *Soils stabilization with geotextile.*

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement, sidewalk, slab and concrete walls neatly along limits of proposed excavation in order that the surface break evenly and cleanly.
- .3 Temporary erosion and sedimentation protection
- .1 Install geotextile sediment barriers in accordance with Section 01 35 43 - *Environmental Procedures* at locations proposing erosion risks, mostly at excavation works along the watercourse and at the perimeter of each soil piles.

3.2 PREPARATION/PROTECTION

- .1 Protect existing features in accordance with Section 01 56 00 - *Temporary Barriers and Enclosures* and applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the Parks Canada Representative.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

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3.3 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated by the plans and specifications after area has been cleared of brush, weeds, grasses, and removed from site.
- .2 Stripping must be done in such a way as to avoid contaminating the topsoil usable for landscaping with underlying materials of different composition. Thus, the depth of clearing varies per the nature of the terrain.
 - .1 Do not mix topsoil with subsoil.
- .3 The Contractor shall, at its own expense, recover and store all the topsoil required for its work and provide the necessary space for storage.
 - .1 Stockpile height not to exceed two (2) m and should be protected from erosion.
 - .2 Supply a localisation plan of soil piles on the site.
- .4 If organic soils cannot be used for landscaping, the Contractor shall dispose them.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and the Health and the Canada Labour Code.
 - .1 Where conditions are unstable, the Contractor's engineer shall verify and advise methods.
- .2 During backfill operation:
 - .1 Unless otherwise indicated or directed by the Parks Canada Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .3 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for the Parks Canada Representative's review, approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

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- .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - *Environmental Procedures* collection runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.6 EXCAVATION

- .1 Advise, by writing, the Parks Canada Representative at least seven (7) working days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Keep the excavated and stockpiled materials at a safe distance away from edge of trench as directed by the Parks Canada Representative and the approved soils piles localisation plan.
- .4 Soil excavated during construction work will be managed in accordance with the requirements of the MELCC's Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés. Water accumulating in the excavations will be pumped into leak-proof containers and analyzed before discharge into storm sewers, if it meets the applicable quality criteria as anticipated or, if not, it will be disposed of off-site in an authorized location.
- .5 Do not obstruct flow of surface drainage or natural watercourses.
- .6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .7 Notify the Parks Canada Representative when bottom of excavation is reached.
- .8 Obtain the Parks Canada Representative's approval of completed excavation.
- .9 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Parks Canada Representative.
- .10 Correct unauthorized over-excavation as follows:
 - .1 Fill under other areas with granular backfill (Type 2) compacted to not less than 90 % of corrected Standard Proctor maximum dry density.
 - .2 If excavated bottom materials have been stirred, compact them to a density at least equal to that of the unmovable soil.

- .11 Install geotextiles, immediately after excavation, in accordance with the Parks Canada Representative and Section 31 32 19.16 - SOILS STABILIZATION WITH GEOTEXTILE.

3.7 STOCKPILING

- .1 The contractor has, at its own expense, to recover and stockpile all the backfill material needed for the works and get the locations for stockpile.
- .1 Stockpile the granular material to prevent segregation.
- .2 The contractor has to take the necessary measure to make sure the compactable excavation material, stockpiled, are protected from bad weather and can be used as backfill.
- .3 The contractor has to expect a minimum of three (3) working days delay before receiving the additional excavated soil qualification results by the soil laboratory mandated by Parks Canada Agency's. All other tests are at the contractor charge.
- .4 Take the appropriated control measure against erosion and sedimentation, in accordance to section 01 35 43 – *Environmental procedures*, to prevent the migration of sediment off the work site limits et towards water streams.

3.8 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.
- .1 Use Granular backfill (Type 2) as indicated on the plans, fill and compact to 90 %.
- .2 Use recoverable material from cuttings as indicated in Plans and compact up to 90%.
- .2 All groundfill materials shall be deposited and applied in uniform layers up to 300 mm thick after settlement. The diameter of the stone present in the embankments must not exceed the thickness of the layer; 300 mm. The diameter of the stones must not exceed the thickness of the layer. In addition, the diameter for the last 300 mm must be less than 150 mm. The Contractor must dispose of stones larger than above mentioned outside the building site. The payment for the disposal of the stones must be provided at the disposal post of the contaminated soils <A.

3.9 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
- .1 The Parks Canada Representative has inspected and approved installations.
- .2 Inspection, testing, approval, and recording location of underground utilities.
- .3 Removal of concrete formwork.

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- .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Do not use materials in the canal or on the banks with fine material (less than 5 mm) that may end up in the water with rainfall or when the dewatered area is put back into the water.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within seventy-two (72) hours after placing of concrete.
 - .3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum fourteen (14) calendar's days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Parks Canada Representative;
 - .2 If approved by the Parks Canada Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Parks Canada Representative.
- .7 Install drainage filter system in backfill as indicated as directed by the Parks Canada Representative.

3.10 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - *Waste Management and Disposal*, trim slopes, and correct defects as directed by the Parks Canada Representative.
- .2 The final leveling shall cover the alterations to be made to render the profiles in accordance with the theoretical longitudinal and transverse lines and all the work required for the cleaning and restoration of the premises.
 - .1 In accordance with sections 32 91 21 – *Topsoil placing and grading* and 32 92 23 – *Sodding*.
 - .2 Return pavements affected by work to condition and level prior to start of work, taking care to respect the original thickness of these structures.
- .3 Clean and rehabilitate areas affected by work as instructed by Parks Canada Representative and in accordance with 01 74 11 – *Cleaning*.

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**EXCAVATING,
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END OF SECTION

**SOIL STABILIZATION
WITH GEOTEXTILE**

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections of Division 01 – General Requirements.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 Use the last edition of these references:
- .2 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .3 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .4 ASTM D4716, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .5 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .3 Canadian General Standards Board (ONGB or CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

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- .5 Minister of Transports of Quebec (MTQ)
 - .1 Standard 13101 – « Géotextiles » of the Tome VII – « Matériaux », of the standards – « Ouvrages routiers »
 - .2 « Cahier des charges et devis généraux » of the MTQ – « Infrastructures routières, Construction et réparation » (edition 2019)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Test and Evaluation Reports:
 - .1 Submit copies of mill test data and certificate at least two (2) weeks prior to start of Work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – *Common Product Requirements* and with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan Waste Reduction Work Plan in accordance with Section 01 74 19 – *Waste Management and Disposal*.

Part 2 Products

2.1 MATERIAL

- .1 Geotextiles: fabrics of woven or nonwoven synthetic fibers, supplied in rolls. Geotextiles must be **Type IV** per Ministry of Transport of Quebec standard 13101. Physical and hydraulic properties of the standard 13101 must be met; the standard can be found in Volume VII of road works standards.

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- .2 Securing pins and washers: to CSA G40.21, Grade 300 W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A123/A123M.
- .3 Factory seams: sewn in accordance with manufacturer's recommendations.
- .4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

Part 3 Execution

3.1 EXAMINATION

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

3.2 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile before finalizing the establishment of a minimum layer of 300 mm of granular material.
- .2 Do not overload soil or aggregate covering on geotextile.

3.3 INSTALLATION

- .1 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .2 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .4 Join successive strips of geotextile with securing pins in the middle of the overlapping strip width.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within four (4) hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of the Parks Canada Representative.

**SOIL STABILIZATION
WITH GEOTEXTILE**

- .8 Place and compact soil layers in accordance with Section 31 23 33.01 – *Excavating, Trenching and Backfilling*.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – *Cleaning*.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All sections 01 – General requirement;
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Product Data: Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit, according to indications, the working method including the execution order of sheet piles insertion to the Government Representative.
- .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec (OIQ), Canada.
 - .2 The sheet piles shop drawings must clearly indicate the fabrication and assembly designed by the contractor engineer.
- .5 Certificates: submit the documents signed by the supplier, certifying that the products and the materials are satisfying the physical characteristics and the performance criteria prescribed by the contractor engineer.

1.3 QUALITY ASSURANCE

- .1 After the construction and after the inspection by an engineer member of the OIQ, the contractor must give to the Departmental Representative a written notice signed by the engineer indicating that the retaining structure is built according to the submitted drawings. The inspection date and time must also be mentioned on the notice.

1.4 REQUIREMENTS AND GEOTECHNICAL PARAMETERS

- .1 The retaining system will have to be design and seal by an engineer according to the site geotechnical particularities, the underground water conditions, the climatic conditions et the proximity of existing structures and infrastructures. In addition, the localization, the drilling logs reports and the geotechnical test results are attached to present specification document.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with section 01 61 00 – *Common product requirements* and with manufacturer's written instructions.

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

Part 2 Execution

2.1 INSTALLATION

- .1 The design, construction and removal of the cofferdam as well as the method of water control are the full responsibility of the Contractor. The work must meet the requirements of the geotechnical investigations for excavation slope, lowering of the water table and other requirements.
- .2 Prior to commencement of the work, the Contractor must submit to the Principal Supervisor the plans for the cofferdam and water control signed and sealed by an engineer member of the *Ordre des ingénieurs du Québec* (OIQ), showing the type and installation method. After installation, the engineer must certify that the construction of the cofferdam is conform to the plans submitted.
- .3 The excavation work must be performed in accordance with the Section 31 23 33.01 – *Excavation, trenching and backfilling*.
- .4 Cofferdams must remain in place until the end of the work and must protect work areas.
- .5 The Contractor must proceed with the rehabilitation of the watercourse bed and revegetation of the site after the work.

2.2 DEWATERING THE COFFERDAM

- .1 The Contractor must pump the water out of the cofferdam and maintain dry excavations throughout the work.
- .2 The Contractor must consider that water infiltration can come from several natural or artificial sources.
- .3 Therefore, the Contractor must take the necessary means such as pumping, the use of impermeable membrane and / or any other method to lower the water table below the level of the excavations to allow dry work. In addition, the Contractor must control the runoff waters from outside the work sites.
- .4 Submit to the Parks Canada Representative details of proposed methods for dewatering excavations or preventing uplift such as dike, placement of well points, and breaking off sheet piles.
- .5 During the installation of cofferdams, the pumped water must be sent into a sedimentation pond. Collected sediments should be disposed off site.

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- .6 The pump used for the drying of a cofferdam must be placed on stones in order to avoid remodeling and directly pumping the bottom of the Canal. It must also be equipped with a strainer or be surrounded by a fence to prevent the capture and mutilation of fish. To prevent the imprisonment of fish inside the enclave dried up, the Contractor shall proceed with their catch and their transfer to white water sections of the Canal or the Richelieu River according to their habitat immediately after the installation.
- .7 Protect the excavations against flooding and damage caused by runoff waters.
- .8 Drain the water in accordance with Section 01 35 43 – *Environmental Protection*, so there is no risk to public or private property, and for other parts of the work.
- .9 Create and maintain drainage ditches and other temporary diversions outside the excavation boundaries.
- .10 Drainage ditches should be designed according to the received and the evacuated flow.
- .11 Clean drainage ditches when filled to 50%.
- .12 Dismantle temporary drainage ditches and reconfigure the area they occupied at the end of the work.

2.3 RESTRICTIONS

- .1 Installation and dismantling procedures for the cofferdam must meet the restrictions in the tables of the Section 01 35 43 – *Environmental Protection*.
- .2 When installing the cofferdam, the materials must be placed on a type 5 geotextile membrane with a thickness of 3.5 mm.
- .3 When machinery is present in the Canal water or on cofferdams, a floating absorbent boom, shall be installed across the Canal downstream of the work site. The boom must be installed so that it does not interfere with boat traffic, except in case of a spill. This boom must be removed before winter and as soon as it is no longer required.
- .4 Do not use materials with fine material (less than 5 mm) that may end up in the water with rain or when re-watering the dewatered area.

2.4 PROTECTION

- .1 Protect the excavation walls by appropriate methods and in accordance with Section 01 35 29.06 – *Health and Safety requirements* and the Canada Occupational Health and Safety Regulations.
- .2 When conditions are unstable, the engineer of the Contractor shall make necessary inspections and identify methods to use.

2.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - *Cleaning*.
- .2 Leave Work area clean at end of each day.

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- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - *Cleaning*.
- .4 Waste management: sort waste for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

END OF SECTION

ELECTRICAL SECTIONS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CSA C22.1-F15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2 No. 0.3-06 (R2014), Test Methods for Electrical Wires and Cables.
 - .3 CAN/CSA-C22.3 No.7-F10, Underground Systems.
 - .4 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .5 CSA 282-09, Emergency Electrical Power Supply for Buildings.
 - .6 CSA-Z462-15, Electrical Safety.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC).
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical and Electronic Terms: Unless otherwise specified or indicated, terms used in these specifications and on drawings are those defined by IEEE SP1122.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit for review single line electrical diagrams under plasticized envelop, in A1 format, and located in the exterior cabinet.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.

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- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 If changes are required, notify Parks Canada Agency (PCA) of these changes before they are made.
- .4 Certificates.
- .1 Provide CSA certified material and equipment.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to an Authority Having Jurisdiction for approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: In accordance with General Conditions of Contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .6 Submit certificate of acceptance from Authority Having Jurisdiction upon completion of Work to Parks Canada Agency (PCA).

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.
- .2 Operation and Maintenance Data: Submit operation and maintenance data:
 - .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 Operating 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's instructions.
- .2 Delivery and Acceptance Requirements: Deliver material and equipment to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials, indoor, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 WORK UNDER TENSION AND DANGER OF ARCING FLASH

- .1 All work must be done "Off".
- .2 Live Work:
 - .1 All work must be done "Off". However, if the Contractor is to perform live work for exceptional reasons, the latter must make a written request to the Departmental Representative with a clear indication of the conditions requiring live work.
 - .2 Any work carried out on live equipment must be carried out in accordance with the CSA Standard Z462 "Safety in the Field of Electricity at Work". Refer to tables 1 and 4 of CSA Standard Z462.
 - .3 The Contractor must obtain acceptance from the Departmental Representative before starting the work under tension.

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- .3 "Electric Arc Hazard" Marking:
 - .1 Provide and install a label on all electrical equipment (except those that comply with CSA Z462, item 4.3.3.1), as requested by the CCQ-E and of type "Figure Q.1" and as shown in Appendix Q of CSA Z462 Standard.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- .1 Operating Voltages: To CAN3-C235.
- .2 Motors, electric heating, control, and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above Standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language Operating Requirements: Provide identification nameplates for control items in French and English.
- .4 Use one nameplate for each language.

2.2 MATERIAL AND EQUIPMENT

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

2.3 EQUIPMENT AND CONTROLS

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

2.4 WIRING TERMINATIONS

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

2.5 WIRING IDENTIFICATION

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

2.6 FINISHES

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

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Prior to installation:
 - .1 Visually inspect substrate in presence of Parks Canada Agency (PCA).
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Parks Canada Agency (PCA).

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.71, except where specified otherwise.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
 - .1 Sleeves through concrete: Plastic, sized for free passage of conduit, and protruding 50 mm.

3.4 LOCATION OF OUTLETS

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

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.6 FIELD QUALITY CONTROL

- .1 Load Balance:
 - .1 Measure phase current of all existing and new panel boards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panel boards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests to:
 - .1 Power distribution system including phasing, voltage, grounding, and load balancing;
 - .2 Circuits originating from branch distribution panels;
 - .3 Lighting and its control;
 - .4 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1,000 V instrument.
 - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Parks Canada Agency (PCA).

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

3.7 SYSTEM START-UP

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

3.8 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 This Section includes requirements for selective demolition and removal of electrical installations.
- .2 Selective demolition works shall consist, but are not limited to, the removal and disposition, in whole or in part, of the following equipment and networks:
 - .1 Electrical distribution, including electrical distribution panels, circuit breakers, cabinet, contactors, conduits, wiring, expansion joints, hardware, and accessories;
 - .2 Lighting fixtures, lamp posts, and controls.

1.2 RELATED REQUIREMENTS

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

1.3 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.4 DEFINITIONS

- .1 Demolish: Dismantle items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel, taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.
- .3 Remove and Salvage: Dismantle items from existing construction and deliver them to Parks Canada Agency (PCA) ready for reuse.
- .4 Remove and Reinstall: Dismantle items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are maintained onsite.

- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment, if handled improperly, as defined by Federal Hazardous Products Act (RSC 1985), including latest amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
.1 Provincial/Territorial Workers' Compensation Boards/Commissions.

1.7 SITE CONDITIONS

- .1 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in Work; immediately notify Parks Canada Agency (PCA) if materials suspected of containing hazardous substances are encountered and perform following activities:
.1 Hazardous substances will be as defined in Hazardous Products Act.
.2 Stop work in area of suspected hazardous substances.
.3 Take preventative measures to limit users' and workers' exposure. Provide barriers and other safety devices and do not disturb.
.4 Hazardous substances will be removed by Parks Canada Agency (PCA) under a separate contract or as a change to Work.
.5 Proceed only after written instructions have been received from Parks Canada Agency (PCA).

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Parks Canada Agency (PCA) will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

3.2 PREPARATION

- .1 Protection of existing systems to remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
 - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts scheduled to remain;
 - .2 Notify Parks Canada Agency (PCA) and cease operations where safety of adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

- .1 Coordinate requirements of this Section as follows:
 - .1 Remove existing luminaires, electrical devices and equipment including associated conduits, boxes, wiring, and similar items, unless specified otherwise;
 - .2 Perform demolition work in a neat and workmanlike manner:
 - .1 Remove tools or equipment after completion of work and leave site clean and ready for subsequent renovation work;
 - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
 - .3 Remove existing conduits, boxes, cabling and wiring, as indicated;
 - .4 Seal open ends of conduit with silicone sealant where they are inaccessible or cannot be removed without damaging adjacent construction.

3.4 CLOSEOUT ACTIVITIES

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
 - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for wire and box connectors for incorporation into manual.

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1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Pressure Type Wire Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors, as required.
- .2 Fixture Type Splicing Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing Stud Connectors: To NEMA and to consist of:
 - .1 Connector body and stud clamp for round copper conductor.
 - .2 Clamp for stranded copper conductors.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper conductors.
 - .5 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured flexible conduits, as required, to CAN/CSA-C22.2 No.18.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and cables, and, depending, proceed with the following:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation must meet secureness tests in accordance with CAN/CSA-C22.2 No.65;
 - .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap;
 - .3 Install bushing stud connectors in accordance with pertinent NEMA Regulations and in accordance with the manufacturer's recommendations.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors (0-1,000 V).
- .3 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA)/CSA International.
 - .1 CSA C22.2 No. 0.3, Testing Methods for Electrical Cables and Wires.

1.3 PRODUCT DATA

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

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 WIRES

- .1 Conductors: Stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper Conductors: Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform the tests according to the methods approved by the local Authority Having Jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

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3.2 GENERAL - CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1,000 V).
- .2 Cable Colour Coding: To Section 26 05 00 - Common Work Results for Electrical.
- .3 Conductor length for parallel feeders to be identical.
- .4 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend.

3.3 INSTALLATION OF WIRES

- .1 Install wiring:
 - .1 In conduits, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions to install the grounding products. Printed product literature and data sheets for grounding equipment must include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for grounding equipment for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoor, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

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- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 EQUIPMENT

- .1 Grounding Conductors: Bare, copper conductors, size as indicated.
- .2 Rod Electrodes: Copper clad steel, 19 mm diameter by 3,000 mm long.
- .3 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 and inspection boxes.
 - .3 Bolted type conductor connectors.
 - .4 Bonding jumpers, straps.
 - .5 Pressure-wire connectors.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate/supports.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION - GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Install connectors in accordance with manufacturer's instructions.
- .2 Protect exposed grounding conductors from mechanical injury.
- .3 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .4 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.
- .5 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

3.3 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections.

3.4 EQUIPMENT GROUNDING

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

3.5 FIELD QUALITY CONTROL

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

3.6 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect hangers and supports from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 SUPPORT CHANNELS

- .1 316L stainless steel "U" shape, size 41 x 41 mm, 2.5 mm thick, set in surface mounted with 316L stainless steel anchor bolts.
- .2 316L stainless steel supports.

- .3 Fasteners made of 316L stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Support equipment, conduit, or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .2 Fasten exposed conduit or cables to structure or support system using clamps.
- .3 For surface mounting of two or more conduits use "U"-channels at a maximal 1.5-m interval.
- .4 Provide metal brackets, frames, hangers, clamps, and related types of support structures where indicated or as required to support conduit and cable runs.
- .5 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .6 Do not use wire lashing or perforated strap to support or secure raceways or cables.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.

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- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.1-F-15, Canadian Electrical Code, Part 1, 23rd Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Provide Shop Drawings: In accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 JUNCTION AND PULL BOXES

- .1 Construction: Cast-iron enclosure.
- .2 Covers Surface Mounted: Threaded.
- .3 Crouse-Hinds, GUA Series or approved equivalent.

2.2 CEMA 3R EXTERIOR CABINET

.1 Description:

- .1 304 stainless-steel cabinet, 12 AWG thick, CSA3 (CEMA 3R), weatherproof. The Contractor is responsible for determining the dimensions required to incorporate all electrical power and distribution equipment and lighting controls. The dimensions given on the drawings are minimal.
- .2 Stainless-steel hardware.
- .3 12 AWG thick 304 stainless-steel door.
- .4 Piano hinge in stainless steel.
- .5 Door with three-point closing mechanisms with round tapered-tipped steel rods with padlock handle in stainless steel and Corbin locks No. 5R-6352. Stainless-steel fixed bar door retainer.
- .6 Galvanized steel mounting plates.
- .7 Neoprene sealing pad and a Lexan window for the metering.
- .8 Ventilation louvres with mosquito nets, filters, and deflectors supplied and installed by the manufacturer. Allow for each side of the cabinets.
- .9 Finish: Painted green color identical to the color of the bridge.
- .10 Provide free space for the addition of equipment for 20% of the interior surface. In addition, a minimum clearance must be provided between the equipment and the enclosure walls. Allow a minimum of 100 mm at the sides and in the top and 300 mm at the bottom.

PART 3 EXECUTION

3.1 JUNCTION, PULL BOXES, AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous, but accessible locations.
- .2 The junction and pull boxes are not indicated. Install pull boxes in order to ensure the conduits between each box have a length inferior to 30 m and in such a way to not have more than two 90° bends.
- .3 All the junction or pull boxes must be of appropriate size, according to the number of conductors and the associated conduit diameter.

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3.2 INSTALLATION OF CEMA 3R EXTERIOR CABINET

- .1 Assemble equipment into the cabinet.
- .2 Mount the cabinet on the structure.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.1-F15, Canadian Electrical Code, Part 1, 23rd Edition.
 - .2 CSA C22.2 No.40 (R2009), Short Circuit, Junction and pull Boxes.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 CONDUIT BOXES

- .1 Hot-dipped galvanized steel cast boxes, GUA Series, green factory-painted, for surface wiring of devices with 2, 3, or 4 threaded outlets.

2.2 FITTINGS - GENERAL

- .1 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.
- .2 Green baked polyester powder, interior and exterior coated.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges, or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .4 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .5 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
- .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
- .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
- .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
- .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheets.
- .1 Submit cable manufacturing data.

1.4 QUALITY INSURANCE

- .1 Test Report: Submit the testing reports delivered by independent and well-known laboratories.
- .2 Certification: Submit the signed documents from the manufacturer, certifying that the products and materials satisfy the required physical characteristics and performance criteria.
- .3 Instructions: Submit installation instructions supplied by the manufacturer.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .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.

1.6 GENERAL

- .1 All the conduits, tubes, and their paths are not necessarily on the drawings. Those that are present are represented schematically.
- .2 All conduits, boxes, and accessories are factory-painted with green baked polyester powder, inside and outside the conduit.

PART 2 PRODUCTS

2.1 CONDUITS

- .1 Rigid Metal Conduit: To CSA C22.2 No. 45, aluminum, threaded.
- .2 Flexible Metal Conduit: To CSA C22.2 No. 56, liquid-tight flexible metal, maximum length of 600 mm.
- .3 Rigid PVC Conduit: To CSA 22.2 No. 211.2.
- .4 Conduits and tubes to have a minimal nominal diameter of 21 mm, unless noted otherwise.

2.2 CONDUIT FASTENINGS

- .1 Two-hole galvanized steel PVC covered straps to secure surface conduits.

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° bends for 25 mm and larger conduits.
- .3 Threaded connectors.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100-mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.
- .4 The flexible conduit shall not be used as an expansion joint.

2.5 FISH CORD

- .1 Polypropylene, length in accordance to each conduit and to exceed each conduit by 3 m.

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 cause minimum interference in spaces through which they pass.
- .2 For exterior, use rigid aluminum threaded conduit.
- .3 Minimum conduit size for lighting and power circuits: 21 mm.
- .4 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than $\frac{1}{10}$ th of its original diameter.
- .5 Mechanically bend conduit over 21 mm diameter.
- .6 Field threads on rigid conduit must be of enough length to draw conduits up tight.
- .7 Install fish cord in empty conduits.
- .8 Use firestop paste around ducts passing through fire separations.
- .9 Dry conduits out before installing wire.

- .10 Install an expansion joint on all conduits every 20 m.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to structure lines.
.2 Group conduits wherever possible on suspended or surface channels.
.3 Do not pass conduits through structural members, except as indicated.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
.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 REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 Insulated Cable Engineers Association, Inc. (ICEA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for cables, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect cables from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for cable installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 CABLE INSTALLATION IN DUCTS

- .1 Install cables in ducts as indicated.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- .6 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.
- .7 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 for Electrical.
- .2 Perform tests using qualified personnel.
 - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.

- .4 Check each feeder for continuity, short circuits and grounds.
 - .1 Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests:
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1,000 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 Provide Parks Canada Agency (PCA) with list of test results showing location at which each test was made, circuit tested, and result of each test.
- .7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.4 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 50 00 - Lighting.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.1-15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for photoelectric devices, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations.
 - .2 Store and protect photoelectric devices from nicks, scratches, and blemishes.
 - .3 Protect metal accessories and trim from being bent or damaged.
 - .4 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 PHOTOELECTRIC LIGHTING CONTROL

- .1 Photoelectric Lighting Controls: To CSA C22.1.
- .1 Mounted locking receptacle.
 - .2 Capable of commanding a lighting contactor.
 - .3 Voltage variation: $\pm 10\%$.
 - .4 Temperature range: -40°C to $+70^{\circ}\text{C}$.
 - .5 Rated for 5,000 operations.
 - .6 Delayed start-up.
 - .7 Wall-mounting bracket.
 - .8 Switching time delay of 30 s.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for lighting control device installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install photoelectric controls in accordance with manufacturer's written instructions and to CSA C22.1.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by lighting control devices installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for panelboards, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
 - .2 Include on drawings:
 - .1 Electrical detail of panel, branch breaker type, quantity, ampacity, and enclosure dimension.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.
- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for panelboards for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect panelboard from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 PANELBOARDS

- .1 Panelboards: To CSA C22.2 No.29 and product of one manufacturer.
 - .1 Install circuit breakers in panelboards before shipment.
 - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 250-V panelboards: Bus and breakers rated for 22 kA (symmetrical) minimally for the 250-V panelboards, unless otherwise indicated.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: Mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Minimum of two flush locks for each panelboard.
- .6 Two keys for each panelboard and key panelboards alike.
- .7 Copper bus with neutral of same ampere rating of mains.
- .8 Mains: Suitable for bolt-on breakers.
- .9 Trim with concealed front bolts and hinges.

- .10 Trim and door finish, grey color baked enamel, type to be “door-in-door” to ease maintenance.
- .11 Ground bus.
- .12 Where the word “Espace” (Space) is used to denominate a circuit, no breaker should be installed, in addition of a removable cover plate. The word “Libre” (Vacant) means to supply and install a breaker.

2.2 BREAKERS

- .1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.
- .2 Breakers with thermal and magnetic tripping in panelboards, except indicated otherwise.
- .3 Main Breaker: Mounted in panel.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Nameplate for each panelboard, size 4, engraved as indicated.
- .3 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for panelboards installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Connect loads to circuits.
- .3 Connect neutral conductors to common neutral bus with respective neutral identified.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by panelboard installations.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CAN/CSA C22.2 No.42.1-F00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national Standard, with UL 514D).
 - .3 CSA C22.2 No.55-FM1986(R2008), Special Use Switches.
 - .4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national Standard, with UL 20).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wiring devices, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
 - .1 Indicate on drawings:
 - .1 The details surrounding the integration in the architectural elements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for wiring devices for incorporation into O&M Manual.

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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 RECEPTACLES

- .1 Duplex receptacles of specified "Industrial" grade type, CSA type 5-15 R, 125 V, 15 A, "U" ground, with following features:
 - .1 Ivory urea moulded housing;
 - .2 Suitable for No. 10 AWG for back and side wiring;
 - .3 Break-off links for use as split receptacles;
 - .4 Eight back wired entrances, four side wiring screws;
 - .5 Triple wipe contacts and rivetted grounding contacts.
- .2 Single outlet receptacles for maintenance, specified "Industrial" quality allowing 15 and 20 A inputs, type CSA 5-20R, 125 V, 20 A.
- .3 Single outlet receptacles, twist-lock, specified "Industrial" quality, type CSA L5-20R, 125 V, 20 A.

- .4 Other outlets designed for allowable tension and ampacity: according to indications on drawings.
- .5 Hospital grade GFI, 15-20 A, 120 V receptacle.
- .6 Receptacles of one manufacturer throughout project.

2.2 COVER PLATES

- .1 Stainless steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .2 All the cover plates must originate from a single and same manufacturer.
- .3 Stainless steel cover plates must be installed according to the specifications for the secured areas, mounted in built-in pull boxes.
- .4 Cast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 Weatherproof during use, double lift spring-loaded cast aluminum cover plates, complete with gaskets for outdoor-rated duplex receptacles, as indicated.
- .6 All installations must be provided by a single manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Receptacles:
 - .1 Install receptacles as indicated.

- .2 Cover Plates:
 - .1 Install suitable common cover plates where wiring devices are grouped.
 - .2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Protect stainless-steel cover plate finish with paper or plastic film until painting and other work is finished.
- .3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.106-05(R2010), HRC-Miscellaneous Fuses.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide fuse performance data characteristics for each fuse type and size above 200 A. The supplied characteristics should also include the average fusion time at a given current.
- .3 Shop Drawings:
 - .1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in storage cabinet.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.5 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 77 00 - Closeout Procedures.
- .2 Three spare fuses of each type and size installed above 600 A.
- .3 Six spare fuses of each type and size installed up to and including 600 A.

PART 2 PRODUCTS

2.1 FUSES - GENERAL

- .1 Fuse type references L1, L2, J1, R1, etc., have been adopted for use in this Specification.
- .2 Fuses: Product of one manufacturer.

2.2 FUSE TYPES

- .1 Class L fuses, 200 kA interruption capacity.
 - .1 Type L1: Time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Type L2: Fast acting.
- .2 Class J fuses, 200 kA interruption capacity.
 - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
- .3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

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PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 24 16.01 - Panelboards Breaker Type.
- .3 Section 26 28 20 - Grounding Fault Circuit Interrupters - Class A.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national Standard with UL 489, and NMX-J-266-ANCE-2010).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for circuit breakers, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage and with an allowable ampacity of 200 A and more.
- .4 Certificates:
 - .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit three copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet Standards and Regulations.
 - .1 Production certificate of origin must be submitted to Parks Canada Agency (PCA) for approval.
 - .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.

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- .3 Any work of manufacturing, assembly, or installation to begin only after acceptance of production certificate of origin by Parks Canada Agency (PCA). Unless complying with this requirement, Parks Canada Agency (PCA) reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
- .4 Production certificate of origin must contain the following information:
 - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate;
 - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account;
 - .3 Contractor's name and address, as well as person responsible for project;
 - .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate;
 - .5 Name and address of building where circuit breakers will be installed:
 - .1 Project title.
 - .2 End user's reference number.
 - .3 List of circuit breakers.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect circuit breaker from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - Waste Management and Disposal.

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PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- .1 Moulded-case circuit breakers, circuit breakers, accessory high-fault protectors and ground-fault circuit-interrupters: To CSA C22.2 No. 5. Rated 22 kA.
- .2 Bolt-on Moulded Case Circuit Breaker: Quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient. Rated 22 kA.
- .3 Common-trip Breakers: With single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers to have minimally the same current interruption capacity as the panel it is installed in.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

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

2.3 MAGNETIC BREAKERS (DESIGN B)

- .1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short-circuit protection.

2.4 ADDITIONAL FEATURES

- .1 Include:
 - .1 Interlock device between two breakers as indicated.
 - .2 "On-Off" locking device for each breaker.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install circuit breakers as indicated.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 24 16.01 - Panelboards Breaker Type.
- .3 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA C22.2 No.144-M91(R2006), Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA).
 - .1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for ground fault circuit interrupters, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
- .4 Test and Evaluation Reports: Submit test report for field testing of ground fault equipment to Parks Canada Agency (PCA) and certificate that system as installed meets criteria specified.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for ground fault circuit interrupters for incorporation into O&M Manual.

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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Equipment and components for ground fault circuit interrupters (GFCI): To CAN/CSA C22.2 No.144.
- .2 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE GROUND FAULT INTERRUPTER

- .1 Two-pole ground fault circuit interrupter for 15 A or 20 A, 120 V, single-phase, with testing and reset devices, as indicated.
 - .1 Transition device to detect ground faults, Class A.
 - .2 Rated 22 Ka.

2.3 GROUND FAULT PROTECTOR UNIT

- .1 Self-contained with 15 A or 20 A, 120 V circuit interrupter and duplex or single receptacle complete with:
 - .1 Solid state ground sensing device.
 - .2 Facility for testing and reset.
 - .3 CSA Enclosure 1, surface-mounted with steel face plate.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for ground fault circuit interrupters installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Do not ground neutral on load side of ground fault relay.
- .2 Pass phase conductors, including neutral, through zero sequence transformers.
- .3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Arrange for field testing of ground fault equipment by the Contractor before commissioning service.
- .3 Demonstrate simulated ground fault tests.

3.4 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: Separate waste material in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI).
 - .1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 ANSI C82.4-02(R2007), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 ASTM International Inc.
 - .1 ASTM F1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 CSA Group (CSA).
- .5 ICES-005-07, Radio Frequency Lighting Devices.
- .6 Underwriters Laboratories of Canada (ULC).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 -Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications, and data sheet, and include product characteristics, performance criteria, physical size, finish, and limitations.
 - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for approval by Parks Canada Agency (PCA).

- .3 Photometric data to include: VCP Table where applicable.

1.4 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.1 TYPE A LIGHTING FIXTURE

- .1 General.
 - .1 The streetlights are designed to meet the requirements of the Canadian Highway Bridge Calculation Code CAN/CSA-S6. The calculations must be provided as well as the workshop drawings of the console and must be signed and sealed by a member engineer in good standing of the Order of Engineers of Quebec.
 - .2 Products.
 - .1 Console.
 - .1 Arm: Must be made of construction steel and fitted with an anchor plate and an HSS steel tube with a tenon. The anchor plate has four holes for its installation on the wooden pole.
 - .2 Length: 300 mm.
 - .3 Lighting Fixture.
 - .1 The housing is A360 injection molded aluminum 0.090 in. (2.4 mm) minimum thickness. The housing accepts a post with a diameter ranging from 1.66 in. (42 mm) to 2³/₈ in. (60 mm) by 6 in. (152 mm) in length. The fastening device includes a reversible zinc-plated mounting bracket, retained by 4 bolts ³/₈-16 UNC. The mounting bracket is pre-assembled for a 2³/₈ in. (60 mm) diameter post. For use on a post de 1.66 in. (42 mm) or 1.9 in. (48 mm) diameter. The mounting bracket must be reversed by others. A molded part in the housing allows an adjustment to ± 5° for ease of maintenance and installation. The enclosure is complete including a secure door preventing it from accidentally falling into the opening and allowing tool-free access to electronic components and a connector block used with bare wires (max. 2 gauge) in the primary. A 13-in. (330 mm) rear clearance is required to remove the door.

- .2 Lighting system: LEDgine composed of four main components:
 - .1 Heatsink.
 - .2 LED lamp.
 - .3 Optical system.
 - .4 Regulator.
- .3 Electrical components comply with RoHS. Maximum operating ambient temperature of 40°C (104°F).
- .4 Heatsink: Molded aluminum to optimize the efficiency and the life of the LEDs. No moving part cooling system is used.
- .5 Lamp: LED module (included), Philips Lumileds LUXEON R LED type, composed of 160 high performance white LEDs. Colour temperature 4,000 K nominal, 70 IRC. Operating lifetime based on TM extrapolation-21 to obtain the results after which 50% of the LEDs maintain more than 70% (L70) of their initial luminous flux. Aluminum-based printed circuit used to ensure better heat transfer and extend the life of the lighting system.
- .6 Optical system: IES type. Equipped with optimized high-performance polymer lenses to achieve maximum spacing, the targeted lumens provide perfect uniformity. The optical system offers an IP66 Class sealing protection rating. Photometric performance is certified by an independent laboratory using the LM Standard-63, LM-79 and TM-15 (IESNA). Street side indicated. Meets the requirements of the starry sky with 0% light pointing upwards and "U0" according to IESNA TM-15.
- .7 Regulator: High power factor of 95%. Electronic regulator, frequency between 50/60 Hz. Automatically adjusts to a voltage between 120 and 277 VAC, Class II, TDH of up to 20%. Maximum operating ambient temperature of -40°F (-40°C) up to 130°F (55°C). Certified to ULC UL1310 Standards. For wet and dry place. Assembled on a turntable and equipped with a Tyco-type slip plug that is resistant to a temperature of 221°F (105°C). The regulator is compatible for dimmer 0-10 V.
- .8 The regulator must reduce the current power sent to the LEDs, if the temperature of the regulator undergoes an internal overheating protecting the LEDs and the electrical components. Equipped with a short output protection-circuit, surge, current overload, automatic recovery after correction.

- .9 Surge protection: Built-in surge protector tested in accordance with ANSI/IEEE C 62.45 ANSI/IEEE c 62.41.2 Scenario I, Category C, high exposure of combined 10 kV/10 kA waveforms for combination line-ground, line-neutral and neutral-ground, and complying with the requirements of US DOE (Department of energy) MSSLC Specification Model (Municipal Solid-State Street Lighting Consortium) for road luminaires for the requirements of electrical immunities for high-level tests 20 kV/20 kA.
 - .10 Sleeve: In injection molded aluminum 360.1, the sleeve is equipped with a watertight door giving access to the regulator and a connector block that is used with bare wires (max. 2 gauge) in the primary. Sealing factor IP66. With an easy-to-install self-adjusting system with two $\frac{3}{8}$ pressure screws-16 UNC. Fits on 4 in. (102 mm) outside diameter x 4 in. (102 mm) long.
 - .11 Manufacturing standards for LED products: Electronic components sensitive to electrostatic discharge (ESD) such as light-emitting diodes (LEDs) are assembled in accordance with the Standards IEC61340-5-1 and ANSI/ESD S 20.20 to eliminate the events of the risk of decreasing the useful life of the product.
 - .12 Vibration resistance: The floor lamp meets the vibration requirements of the ANSI C 136.31 Standard, American National Standard for a Bridge/Viaduct Application (Tested by an independent laboratory for 3G with 100,000 cycles).
- .4 Finishing.
- .1 Finished: Color with black textured finish (BKTX) and complies with AAMA 2603 Standard. Application of a thermosetting polyester paint (4 mils/100 microns) with a tolerance of ± 1 mils/24 microns. Thermosetting resins provide fading resistance according to ASTM D2244, gloss retention according to ASTM D523, and is impervious to moisture according to ASTM D2247.
 - .2 The surface treatment achieves a minimum of 2,000 hours for the resistance to saline mist and the tests are carried out according to the ASTM Standard- B117.
- .5 Material.
- .1 Type A - Lighting fixture:
 - .1 Lighting fixture: Philips, Model RVS-55W32LED4K-G2-LE3-UNV-AST-HS-SP2-RC-PHXL-BK or approved equivalent product by Parks Canada Agency (PCA).
 - .2 Console: Specifically made.

.6 Execution.

.1 Installation.

.1 Erection of lighting fixtures:

- .2 After receiving the approval of the Parks Canada Agency (PCA), the Contractor can install the luminaires and consoles, perfectly cleaned beforehand. The anchor bolts and nuts must be coated with a fibrous grease and tightened thoroughly so as not to leave any play.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Locate and install lighting fixtures as indicated.

3.2 WIRING

- .1 Connect the equipment to electrical and control circuits:

- .1 Install wiring in rigid aluminium conduit.

3.3 CLEANING

- .1 Clean and remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

DIVISION 33

Utilities

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)/National Electrical Manufacturers (NEMA).
 - .1 ANSI/NEMA C29.17-2002, Composite-Line Post Type Insulators.
 - .2 ANSI/NEMA C29.18-2003, Composite-Distribution Line Post Type Insulators.
 - .3 ANSI/NEMA C29.3-1986 (R2002), Wet-Processed Porcelain Insulators (Spool Type).
 - .4 ANSI/NEMA C29.4-1989 (R2002), Wet-Processed Porcelain Insulators (Strain Type).
 - .5 ANSI/NEMA C29.5-1984 (R2002), Wet-Process Porcelain Insulators (Low- and Medium-Voltage Pin Type).
- .2 Canadian Electrical Association Purchasing Specification (CEA).
 - .1 CEA LWIWG-02-96, Line Post Composite Insulator for Overhead Distribution Lines.
- .3 CSA Group (CSA).
 - .1 CAN/CSA-G12-92 (R2007), Zinc-Coated Steel Wire Strand.
 - .2 CAN/CSA-C83-96 (R2005), Communication and Power Line Hardware.
 - .3 CAN/CSA-O80 Series-08, Wood Preservation.
 - .4 CAN/CSA-O15-05, Wood Utility Poles and Reinforcing Stubs.
 - .5 CSA O116-1969 (R2008), Power and Communication Sawn Wood Crossarms.
- .4 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
 - .1 EEMAC 1B-1, 1957, Standard for Wet Process Porcelain Insulators (Strain Type).

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- .2 EEMAC 2B-1, 1957, Standard for Wet Process Porcelain Insulators (Spool Type).
- .5 Local Utility Standards.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada, indicating:
 - .1 Materials.
 - .2 Method of anchorage.
 - .3 Number of anchors.
 - .4 Supports.
 - .5 Reinforcement.
 - .6 Assembly details.
 - .7 Accessories.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance Submittals: Submit following:
 - .1 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Manufacturer's Instructions: Submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.
- .2 Perform work in accordance with relevant provincial/territorial regulations.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Wood Preservation: To CAN/CSA O80 Series.
- .2 Power Line Hardware: To CAN/CSA-C83.
- .3 Wood Utility Poles: To CAN/CSA-O15, wood species grey pine, Class 3, preservative treated.
 - .1 10-m post.
- .4 Reinforcing Stubs: To CAN/CSA-O15, wood species grey pine, Class 3.
 - .1 Wood preservative: In accordance with current standards.

2.2 INSULATORS

- .1 Secondary Insulators:
 - .1 Spool type: To ANSI/NEMA C29.3 and EEMAC2B-1, mounted on secondary racks, for secondary runs.
- .2 Guy Strain Insulators:
 - .1 Strain type: To EEMAC1B-1 and ANSI/NEMA C29.4, nominal rating 5 kV, one (1) per guy wire.
- .3 Suspension/dead end insulators nominal rating 5 kV.

2.3 GUYS AND ANCHORS

- .1 Guy Wire: To CAN/CSA-G12, 9 mm nominal diameter, stranded, galvanized steel for dead ends and guys.

- .2 Guy Clamps: Three-bolt heavy duty or preform grip type.
- .3 Eye Bolt: 19 mm diameter, length to suit. four-hole guy straps, and 16-mm machine bolt with square washer to attach guy wire to pole.
- .4 Anchor Rod: 19 mm diameter x 2.7 m long, galvanized steel with thimble eye.
- .5 Anchor: Manufacturer's standard, approved by Departmental Representative.
 - .1 Heavy-duty expanding type, four-way, expanded area.
- .6 Guy Guard: Plastic, yellow, 2.7 m long.

2.4 WIRE CONNECTORS

- .1 In accordance with the wire size and with a plastic cover.

2.5 EQUIPMENT IDENTIFICATION

- .1 Rustproof number nails with 50-mm high designated number.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Install electrical pole lines and hardware in accordance with manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 PREPARATION OF POLES

- .1 Where poles require shortening, cut piece from peak only.
- .2 Shape peak of poles with two cuts forming 45° slopes.
- .3 Treat peak, gains, and bored holes with preservative before assembly.
- .4 Bore hole in centre of pole to introduce cross beam bolt.
- .5 Attach insulators.

3.3 INSTALLATION

- .1 Install the pole at the same location as the existing and dig a hole 1.8 meters deep.
 - .1 Make hole large enough to allow space for tamping backfill.

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- .2 Set pole.
- .3 Align pole with insulator brackets.
- .4 Replace backfill in 150-mm layers.
 - .1 Tamp each layer and apply final layer to drain water away from pole.
- .5 If required, locate and install guy wires and anchors at pole.
- .6 Insert anchor at least 1.8 m into ground. Backfill and tamp in 150-mm layers.
- .7 Install insulators.
- .8 Install number nails on each pole.

3.4 FIELD QUALITY CONTROL

- .1 Perform tests and field inspection for pole lines and hardware prior to energization.
- .2 Use qualified tradespersons for installation, termination, and testing of low voltage power lines and hardware.
- .3 Submit test result and inspection certificate for review.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION