

Prepared for :

Canadian Coast Guard



Pêches et Océans
Canada

CANADIAN COAST GUARD EQUIPMENT SHELTER REPLACEMENTS

Civil Work Engineering Specifications

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References

- Geotechnical investigation report – (site specific)
- Contract drawings – (standard or site specific)
- Other standard or code mentioned in any sections of this specification

Project drawings

Standard drawings

Drawing No	Title
- 09152-B036-E-01	Électricité/Electricity Vue en plan / Plan view
- 09152-B036-E-02	Électricité/Electricity Détails / Details
- 09152-B036-E-03	Électricité/Electricity Détails / Details
- 09152-B036-SF F01	Structure / Structural Plan d'installation / Installation plan Coupes et détails / Plan view, sections and details
- 09152-B036-SF F02	Structure / Structural Plan d'installation / Installation plan Coupes et détails pont de guide d'ondes / Cable tray sections and details
- 09152-B036-SI-01	Structure / Structural Plan de fabrication / Construction plan Vue en plan, coupes et détails / Plan view, sections and details
- 09152-B036-SI-02	Structure / Structural Plan de fabrication / Construction plan Coupes et détails / Sections and details
- 09152-B036-SI-03	Structure / Structural Plan de fabrication / Construction plan Vues en plan, élévation et détails / Plan views, elevation and details.
- 09152-B036-V-01	Mécanique Ventilation / Ventilation Vue en plan / Plan view
- 09152-B036-V-02	Mécanique Légende / Legend Schéma et détail / Diagram and detail
- 09152-B036-AG-01	Plans d'architecture / Architectural plans Vue en plan / Coupe / Détails Plan view / Section and details

Drawing No	Title
- 09152-B036-AG-02	Plans d'architecture / Architectural plans Elevations / Details
- 09152-B036-AG-03	Plans d'architecture / Architectural plans Portes/ Cadres / Détails - Doors / Frames / Details
- 091152-B036-MALT-01	Système de MALT/ Grounding System
- 091152-B036-MALT-02	Système de MALT/ Grounding System

Site specific drawings

For each site, one or more site specific drawing will be provided.

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 33 00 – Submittal Procedures.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work covered by this contract includes the replacement of an equipment shelter owned by the Canadian Coast Guard (CCG), the associated site layout, and all related work at the telecommunications site.
- .2 Location, extent and nature of the work are shown in Contract Drawings (**refer to the site particularities for the specific drawings**).
- .3 The locations of the work are at the following sites:
 - .1 Telecommunications site
 Refer to the site specific drawings for the exact coordinates
 - .2 CCG's equipment shelter and associated elements storing site (Lauzon, QC)
 The site is located in Lévis, at the telecommunications site Lauzon owned by the CCG, next to (right hand side) of civic address 6883 Guillaume Couture Boulevard, Lévis, Québec, G6V 9H5.

1.3 SCOPE OF WORK

- .1 The work includes material procurement, labour, tools, equipment, services, protection, and transportation required to perform the contract in conformity with the Contract Drawings and sections included in these specifications.
- .2 The CCG will not supply any material or equipment other than those listed below, even if another clause implies the opposite:
 - .1 Equipment shelter.
 - .2 Shelter's ice-shield.
 - .3 Shelters' stairways (2).
 - .4 Diesel tank's filling platform.
 - .5 Coaxial cables (new or existing to be reused).
- .3 The supplied material and equipment will be considered in excellent state. Should the Contractor notice some irregularities, he must notify them before the material transportation from Lauzon to the telecommunications site.
- .4 The existing coaxial cables will be considered in excellent state. Should the Contractor notice some irregularities, he must notify them immediately. If the cables are damaged during their manipulation, the Contractor must immediately proceed with a temporary repair, and he must afterward replace the cables on their full length, including the sections in the tower. No splices will be accepted at the end of the work.
- .5 Subcontractors' work coordination and distribution are the Contractor's sole responsibility, and all mentions in the contract documents referring to subcontractors must not be interpreted as a bond between the CCG and the subcontractors.

1.4 ACTIVITIES

- .1 The following list is not exhaustive and does not release the Contractor from his engagement to complete any other work, modification or change necessary to adequately complete all work of the present contract.
- .2 The following list does not represent the exact work sequence.
- .3 The shelter replacement work includes, but is not limited to, the following activities:
 - .1 Produce the shop drawings and data sheets of the elements to be supplied by the Contractor.
 - .2 Locate the underground utilities (coaxial cables, grounding conductors, etc.).
 - .3 Deforest, uproot, and clear the existing vegetation according to the Contract Drawings' specified zones and the specification's instructions (**when applicable, refer to the site specific drawings**).

- .4 Provide and install the new fence and its foundation. Install a double gate of 5m width for the vehicles and a 1/3-2/3 pedestrian door of 1.5m width. Perform the work in conformance with the Contract Drawings and this specification (**when applicable, refer to the site specific drawings**).
- .5 Repair the damaged fence's sections (**when applicable**).
- .6 Ground the fence sections (**when applicable, refer to the site specific drawings**).
- .7 Lock the double gate at the end of each day and at the work completion.
- .8 **If the new shelter is located at the same location as the existing shelter:**
 1. Plan and install temporary foundations for the relocation of the existing shelter. The Contractor is responsible for the foundation's stability.
 2. Relocate the existing shelter to its temporary location (refer to the site specific drawings). When applicable, unearth the existing coaxial cables and reroute towards the temporary location. Coordinate with the CCG for the cable's disconnection and reconnection. Reconnect the temporary shelter's electrical power supply in the same day as the relocation.
 3. Provide and install the temporary grounding system. Install a grounding conductor 2/0 between the equipment grounding bus bar under the feed-thru inside the shelter and the closest grounding loop (previous shelter location, tower, or fence). Use a 2-hole lug to connect the conductor to the grounding bar and a compression lug to connect to the existing loop.
- .9 Excavate the soil and rock with appropriate equipment at the locations of the new foundations, waveguide bridge, grounding system, electrical utility pole, underground conduits, etc. Excavation slope must be safe and conform to the geotechnical report and/or CNESST recommendations.
- .10 Design, provide and install all necessary elements to stabilise and shore the existing structures (shelter, tower, guys, etc.). (**When applicable**).
- .11 Transport the excavated materials outside of the property, in an authorized site respecting all applicable regulations.
- .12 Subcontract a geotechnical laboratory to perform, without being limited to, the following activities: validation of the excavation's bottom prior to concrete placement, retrieve concrete samples for the tests required by this specification.
- .13 Build all new reinforced concrete foundations (equipment shelter, stairways, waveguide bridge, fence, etc.). Foundations shall be constructed and installed as shown on the contract drawings and per the recommendations of the geotechnical study report.
- .14 Provide and install the waveguide bridge and/or the underground cable tray for the coaxial cables.
- .15 Provide and install a new electrical utility pole, its concrete protection and the associated underground conduits (**when applicable, refer to the site specific drawings**).

- .16 Gather and transport the new equipment shelter, its accessories, and all elements provided by the CCG from Lauzon to the site. Protect the elements to avoid damages during transportation and at any other time.
- .17 Protect the access road and restore if required. If needed, add “MG-20” granular material to ensure the access road is rideable and exempt of cracks and ruts.
- .18 Install the new equipment shelter and its accessories on the new foundations and fix the stairways, the filling platform and the ice-shield.
- .19 Coordinate with the CCG and Hydro-Québec, provide all necessary elements and install the electric and telephonic connexions between the existing Hydro-Québec pole and the new CCG’s equipment shelter (aerial or underground, **refer to the site specific drawings**). The Contractor must provide and install a temporary electrical aerial power supply for the old shelter during the equipment transfer *via* the new shelter. Coordinate all services cut with the CCG.
- .20 Install the new grounding system and connect the new installations to the existing grounding system in accordance with the Contract Drawings and the Electrical Code.
- .21 Install or fasten the transmission lines from the tower on the new waveguide bridge to the shelter feed-thru. Provide and install new cable trays if necessary (**refer to the site specific drawings**). Coordinate with the CCG the connexions to the equipment and all cable length modification or replacement.
- .22 Backfill the excavations following the stratigraphy shown on the Contract Drawings. Excavated material can be reused instead of granular material “CG-14” if permitted by the geotechnical report.
- .23 Fill the new diesel tank with « new » diesel.
- .24 Drain the existing diesel tank and purge the generator (oil and diesel) according to the applicable environmental standards to ensure a safe transportation of the equipment. Dispose of the fluids according to the applicable environmental standards.
- .25 Dismantle the existing (aerial or buried) electric power line between the Hydro-Québec existing utility post and the obsolete equipment shelter.
- .26 Dismantle the temporary aerial electric power line between the obsolete equipment shelter and the new shelter.
- .27 Following the equipment transfer from the obsolete shelter to the new one by the CCG, dismantle, remove and transport outside of the property the obsolete elements such as: the generator, diesel tank, ice-shield, foundations, waveguide bridge, grounding conductors, and the obsolete shelter. Also dispose of the elements inside of the obsolete shelter when requested by the CCG. Select the disposal site to respect all applicable standards and regulation.
- .28 Transport the demolition debris outside of the property, in an authorized site respecting all applicable standards and regulations.
- .29 Backfill the voids created by the debris removal following the stratigraphy shown on the Contract Drawings and these specifications.

- .30 Complete the surfacing of the compound area and access road. Remove the topsoil. Add a geomembrane and granular material conforming to these specifications on the entire area of the work zone, in the compound area and up to 1m all around the fence. The surfacing layer must be installed with a 2% slope for drainage, oriented from the tower to the exterior of the site. **(Refer to the site specific drawings).**
- .31 Establish a work method and sequence for the lifting and relocation of the shelters (relocation of existing shelter to its temporary location, the installation of the new shelter, or disposal of the obsolete shelter). The procedure must account for the site specific conditions and obstacles. Ensure no damages are done to the existing structures and installations during the relocations.
- .32 Restore the site to its initial state, including the damaged work zones and the access roads where necessary.
- .33 Request and obtain from the CCG a final acceptance for the work.
- .34 Annotate the Contract Drawings for the « as built ».

1.5 WORK SEQUENCE

- .1 The Contractor must coordinate the beginning of the work with the CCG by providing a detailed schedule for all the work's duration. Any modification must be rapidly transmitted to the CCG to ensure an adequate synchronisation of all parties
- .2 The Contractor must submit to the CCG, before the fabrication's beginning, the shop drawings and data sheets required to perform the contract. The Contractor must allow the CCG at least fifteen (15) working days for the documents' review.
- .3 The Contractor must notify at least seven (7) working days in advance of any planned service outage.
- .4 The Contractor must request an inspection to the CCG when required by the specifications. The Contractor must receive the authorization before proceeding with the work.
- .5 When required, the Contractor must request a conditional acceptance to the CCG before proceeding with the work.
- .6 At the end of the work, the Contractor must request a final acceptance to the CCG.
- .7 The Contractor is responsible to plan all of the work and time schedule taking into account the continuity of the telecommunication services as described in section 01 14 00 - Work Restrictions.

1.6 CONTRACTOR USE OF PREMISES

- .1 The use of the site by the Contractor is restricted to the zones necessary for the work execution, storage, and site access. The limitation purpose is to ensure the continuity of the CCG's telecommunication services.
- .2 The storage and sorting areas, if required, must be coordinated with the CCG before the beginning of the work.

- .3 The use of the site must be coordinated by the Contractor to avoid damages to the existing elements.
- .4 The work sequence and operating methods selected by the Contractor must allow for the following, at all time during the work :
 - .1 Permit, at all time, a safe access to the CCG's personnel.
 - .2 Conform to the section 01 14 00 - Work Restrictions.
- .5 At the end of the work, the existing elements, including the access roads, must be restored to their initial or better state.

Part 2 **Products**
Not used.

Part 3 **Execution**
Not used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 35 29.06 – Health and Safety Requirements
- .3 Section 01 35 43 – Environmental Procedures

1.2 SITE ACCESS

- .1 The work zone in the compound area will be accessible by the access road intended for that purpose.
- .2 If the access is found insufficient for a given activity, notify the CCG. The Contractor must design and implement temporary access roads separated from the existing elements and conform to the municipal, provincial, or other applicable regulations. These temporary access roads must be maintained by the Contractor during the work and restored to the CCG's satisfaction at the end of the work.

1.3 USE OF THE PREMISE AND OF THE FACILITIES

- .1 Perform the work with the least possible disturbance to the normal use of the sites. Restrict the work to the zones necessary for the work execution.
- .2 Ensure a safe access to the CCG's personnel and vehicles.
- .3 When safety has been reduced to perform the work, plan for other temporary methods to ensure the safety of the people and goods on the site. At the end of each day, the Contractor must cover the excavations and/or install fences around the dangerous zones.
- .4 At the end of each day, the compound areas must be secured, the gates locked and the openings adequately blocked.
- .5 Evaluate the available airspace before the beginning of the work. Prevent interferences between the existing elements, the antennas' signals and the equipment required to perform the work.

1.4 PRELIMINARY SITE WORK

- .1 Visit the site and inspect the existing elements to determine the elements that could be damaged during the work. Plan for a specific protection for these elements to ensure their integrity during the work.
- .2 Notify the CCG before the beginning of the work of any anomalies, omission or differences between the site's real conditions and the Contract Drawings. Consider doing the work according to the existing conditions. After the work's beginning, the Contractor will be held responsible for any damaged elements non-previously signaled. Undertaking the work implies that the existing conditions have been accepted.

1.5 EXISTING SERVICES

- .1 Notify the CCG of any planned telecommunication services outages at least seven (7) working days in advance and obtain the required authorizations to proceed.

1.6 SPECIAL REQUIREMENTS

- .1 The Contractor must conform to the environmental prescriptions of section 01 35 43 - Environmental Procedures.
- .2 The schedule and construction work must account for the continuity of the telecommunication services and for the hold points mentioned in section 01 11 00 – Summary of Work.
- .3 Ensure that the Contractor's personnel working on the site know and comply with the regulations, in particular the safety rules mentioned in section 01 35 29.06 – Health and Safety Requirements.
- .4 The use of dynamite or any other explosives is strictly forbidden.

Part 2 Products

Not used.

Part 3 Execution

Not used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Issue the submittals for review by the CCG as soon as possible and in an orderly sequence not to cause delay in the work. Failure to submit in ample time is not considered a sufficient reason for an extension of the contract time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with the work affected by submittals until the review is completed.
- .3 Shop drawings, product data, samples and mock-ups must be in metric units (SI).
- .4 Where items or information is not produced in SI units converted values are acceptable.
- .5 Review, stamped or signed submittals prior their submission to the CCG. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of the work and contract documents. Submittals not stamped, signed, dated, and identified to the specific project will be returned without being examined and considered rejected.
- .6 Notify the CCG, in writing at the time of submission, of equivalences or deviations from the contract documents stating the reasons for the deviations. Submit the supporting documents necessary for the request review and obtain the CCG's authorization before proceeding. Allow reasonable time for the CCG review.
- .7 The Contractor's responsibility for deviations to the contract documents is not relieved by the CCG's review of submissions, unless the CCG gives written acceptance of specific deviations.
- .8 Verify field measurements to affected adjacent structures to ensure they are exact.
- .9 The Contractor's responsibility for errors and omissions to contract documents is not relieved by the CCG's review of the submissions
- .10 Make all changes requested by the CCG to conform with the contract documents and resubmit to the CCG for review and approval.
- .11 When resubmitting, notify the CCG in writing of any revisions other than those requested.
- .12 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND DATA SHEETS

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate in details a portion of the work.
- .2 Submit shop drawings signed and sealed by a professional engineer registered or licensed in the province of Quebec (Ordre des Ingénieurs du Québec).

- .3 Indicate, on the shop drawings, materials, methods of construction in addition to fasteners or anchors. The shop drawings must include erection diagrams, connections, explanatory notes and other information necessary for the work's completion. Where elements or equipment are attached or connected to other elements or equipment, indicate that such items have been coordinated, regardless of the section under which adjacent items will be supplied and installed. Indicate cross references on drawings and specifications.
- .4 Coordinate each submission with the work's requirements and the contract documents. Individual submissions will not be reviewed until all related information is available.
- .5 The exact format of submittals will be agreed upon by the Contractor and the CCG. Allow at least fifteen (15) working days for the CCG to review each submission.
- .6 Provide space for the Contractor's and the CCG's "Document Review" stamps.
- .7 Adjustments made on the shop drawings by the CCG are not intended to change the contract prices. If adjustments affect the value of the work, notify in writing the CCG prior to proceeding with the work. Modify the shop drawings in conformance with the CCG's requests and the contract document specifications.
- .8 If the shop drawings are rejected, the revised shop drawings must be submitted in conformance with the abovementioned specifications before proceeding with the fabrication.
- .9 The transmittal slip must include the following information :
 - .1 Date of submission or revision.
 - .2 Project title and number.
 - .3 Contractor, subcontractor, manufacturer, or supplier's name and address.
 - .4 Identification and quantity of shop drawings, product data and samples.
 - .5 The Contractor's stamps, signed by the authorised representative, attesting that the submitted documents are approved, that the measurements taken on site have been verified, and that the submittal conform to the contract documents.
 - .6 Other details on the specific portions of the work.
 - .7 Other pertinent data.
- .10 When shop drawings are not required due to the use a standard product, submit the data sheets or the relevant information from the supplier as prescribed by the technical sections of the specifications and requested by the CCG.
- .11 Delete the information not applicable to the project.
- .12 Supplement standard information to provide details applicable to the project.

Part 2 Products

Not used.

Part 3 Execution

Not used.

END OF SECTION

Part 1 General**1.1 PRIORITY**

- .1 Manage the site's operations in a way to ensure that the Contractor and the CCG's personnel health and safety as well as environment protection always take precedence over cost and scheduling considerations.

1.2 RELATED SECTIONS

- .1 Section 01 35 43 – Environmental Procedures

1.3 REFERENCES

- .1 Canada Labour Code, Part II, Canada Occupational Health and Safety Regulations.
- .2 Canadian Standards Association (CAN/CSA).
- .3 Board of Directors of the Canadian Standards Association (CAN/CSA).
- .4 Workplace Hazardous Materials Information System (WHMIS) / Health Canada
- .5 R.S.Q. Chapter S-2.1 — An Act respecting occupational health and safety
- .6 S-2.1, r.4 — Safety Code for the construction industry
- .7 S-2.1, r.13 — Regulation respecting occupational health and safety

1.4 SUBMITTALS

- .1 Elaborate and submit a site-specific Health and Safety Plan before the beginning of the work. If the work differs from the initial plan, the Contractor must update its Health and Safety Plan. The Contractor must make all necessary corrections before the beginning of the work.
- .2 The review of the Contractor's Health and Safety Plan by the CCG must not be considered an endorsement of the Plan. The Contractor remains entirely responsible of the health and safety of the workers during the construction.
- .3 Submit to the CCG, within 24 hours, a copy of any inspection report, correction notice, or recommendation issued by federal or provincial inspectors.
- .4 Submit to the CCG, within 24 hours, a copy of the investigation report for any accident involving injury and any incident exposing a potential hazard.
- .5 The Contractor must have, readily available, copies of all training certificates required for the application of the safety program, in particular:
 - .1 General construction's site health and safety courses.
 - .2 Safety officer attestations.

- .3 Workplace first-aid and cardiopulmonary resuscitation training.
 - .4 Wearing and fitting of individual protective gear.
 - .5 At-height and fall rescue training attestation.
 - .6 Any other requirements listed in regulations or the safety Plan.
- .6 The Safety Plan must include emergency procedures.

1.5 HAZARDS ASSESSMENT

- .1 Identify all hazards inherent to each task to be carried out on-site.
- .2 Plan and organize the work in such a way to eliminate the cause of hazards and to promote collective protection measures so that the use of individual protection equipment can be kept to a minimum. Where individual protection against fall is required, workers shall use safety harness that conforms to the standard CAN/CSA- Z-259.10. Safety belts must not be used as a protection against fall.
- .3 Equipment, tools, or protective gear which cannot be installed, fitted or used without compromising the workers or public health and safety, is deemed inadequate for the work to be executed.
- .4 A worker can use his right to refuse to work for safety concerns during the construction. In this case, the Contractor must conform to the legal procedures. Also, the Contractor must inform the CCG's representatives verbally and in writing.

1.6 LEGAL AND REGULATORY REQUIREMENTS

- .1 Comply with all legislations, regulations and standards applicable to the work and its related activities.
- .2 Comply with specified standards and regulations to ensure safe operations on site contaminated by hazardous or toxic materials.
- .3 Regardless of the publication date shown in the Construction Safety Code, always use the most-recent version.

1.7 SITE SPECIFIC CONDITIONS

- .1 The Contractor must secure the structures and trenches to ensure the stability of the work and the workers' safety from the beginning of the work up to the final acceptance of the work.

1.8 HEALTH AND SAFETY MANAGEMENT

- .1 Acknowledge and assume all tasks and obligations which are customarily the responsibility of a principal Contractor under the terms of the Occupational Health and Safety Act (R.S.Q., chapter S-2.1) and the Safety Code for the construction industry (S-2.1, r.4).

- .2 Develop a site specific prevention program based on hazards identification and apply this program from the project start to the last demobilization steps. The safety program must take into account all aspects of the project and must be submitted to all involved parties. The prevention program must at least include:
 - .1 Identification of site-specific hazards.
 - .2 Risk assessment in relation to the tasks to be carried out, including preventive measures and the procedures.
 - .3 Training requirements.
 - .4 Procedures in case of accident/injury.
 - .5 Written commitment from all parties to comply with the prevention program.
- .3 The Contractor must develop an effective emergency plan based on the site and surroundings' characteristics and constraints. Submit the emergency plan to all involved parties. The emergency plan must at least include:
 - .1 Identification of site's responsible personnel.
 - .2 Identification of first-aid attendants.
 - .3 Training required for personnel responsible of the plan enforcement.
 - .4 Any other relevant information, considering the site characteristics.
- .4 The Contractor must take immediate necessary actions to correct all issues judged non-compliant with the Health and Safety Plan.
- .5 Submit to the CCG a written report of all actions taken to correct non-compliant Health and Safety Plan issues.
- .6 The CCG's representative can order the work to be stopped if the Contractor does not make the necessary modifications to the issues non-compliant with the Health and Safety Plan.

1.9 RESPONSIBILITY

- .1 No matter the size of the site or the number of workers, designate a responsible to supervise the health and safety issues. Take all necessary measures to ensure health and safety of people and assets in the immediate vicinity of the site and in locations likely to be affected by the work.
- .2 Take all necessary measures to ensure application of and compliance with the health and safety requirements of the Contract Documents, applicable Federal and Provincial regulations and standards as well as the site-specific safety program. Comply without delay to any corrective items issued by the "Commission de la santé et de la sécurité au travail" (CSST).
- .3 Take all necessary measures to keep the site clean and in good order throughout the work.

1.10 BLASTING

- .1 The use of dynamite or any other explosives is strictly forbidden.

1.11 LIFTING DEVICES AND OPERATIONS

- .1 Locate lifting devices in order to avoid carrying loads over workers, occupants or the public.
- .2 The Contractor must develop a work procedure, including the crane location, the trajectory of the loads, the mast length and a plan of the lifting methods. All mobile cranes manufactured after January 1st, 1980 must be equipped with a safety device against overload.
- .3 All cable-mobile cranes, must be equipped with a safety device against blocking hoist, except if the mobile crane is not intent to lift loads.
- .4 The Contractor must request and keep in file a mechanical service inspection certificate for each lifting device. Inspections must be carried out prior to the delivery of equipment to the site.
- .5 In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all crane and crane-truck cabs.
- .6 Carefully inspect all the slings and lifting accessories and make sure that those in poor condition are destroyed or scrapped.

Part 2 Products

Not used.

Part 3 Execution

Not used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian Environmental Protection Act, S.C. 1999, c.33.
- .2 Transportation of Dangerous Goods Act, S.C. 1992, c.34.
- .3 Transportation of Dangerous Goods Regulations including the amendment SOR/2012-245.
- .4 Workplace Hazardous Materials Information System (WHMIS) / Health Canada
- .5 Relevant federal, provincial and municipal environmental laws and regulations.

1.2 ENVIRONMENTAL AUDIT

- .1 In addition to the requirement of this section, the Contractor must fulfill the mitigation measures and the site specific requirements of the environmental audit. If there is any discrepancy between the specification and the environmental audit or permits, the most restrictive method must be used.
- .2 The environmental audit and data are available for consultation.

1.3 FIRES

- .1 Fires and rubbish burning on-site are strictly forbidden.

1.4 DEBRIS MANAGEMENT, WASTE AND DRY MATERIALS

- .1 The Contractor becomes the owner of all materials that need to be removed from the site.
- .2 Burying rubbish and waste materials on site is strictly forbidden.
- .3 Grade and classify all demolition and excavation materials to manage their future use or disposal in compliance with all applicable regulations. The demolition materials must not be used for backfill.
- .4 Materials like steel and copper can easily be recycled. These materials must be specified as recyclable.
- .5 Plan all necessary installations and zones required to grade and classify reusable or disposable materials that will be transported outside of the site
- .6 Gradually dispose of non-reusable material from demolition outside of the work site in an authorized site.

- .7 Waste materials from demolition must be recycled if possible, and if not, the site of disposal must be authorized by the “Ministère du Développement durable, de l’Environnement et des Parcs (MDDEP)” and approved by the CCG. The Contractor must ensure that the material meets the admission criteria of the selected sites and get a reception slip from the site operator.

1.5 MANAGEMENT OF MATERIALS FROM THE EXCAVATIONS

- .1 Excavation work will produce an excess of disposable material.
- .2 When excavated soils must be disposed of outside of the site, the Contractor must comply with the environmental applicable standards
- .3 Waste materials from the excavation must be recycled if possible, and if not, the site of disposal must be authorized by the “Ministère du Développement durable, de l’Environnement et des Parcs (MDDEP)” and approved by the CCG. The Contractor must ensure that the material meets the admission criteria of the selected sites and get a reception slip from the site operator.
- .4 The Contractor must obtain an approval certificate from the site disposal operator for the reception of the material. The certificate must confirm that the site operator accepts all material or waste received.
- .5 If soils showing traces of contamination (spot, smell, debris, etc.) are detected in a presumed non-contaminated sector, the Contractor must stop the work, immediately request instructions from the CCG, and do the following:
 - .1 The excavated soils showing evidences of petroleum hydrocarbon contamination must be placed on a tarpaulin and analyzed by the CCG to determine the contamination level before disposing of the material.
 - .2 The Contractor must allow a one-week delay for the soil analysis by the CCG before disposing of the material.

1.6 MANAGEMENT OF HAZARDOUS FLUIDS

- .1 Transport hazardous materials in compliance with the Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations and relevant provincial regulations.
- .2 Before shipping hazardous materials, obtain a written notice from the selected site for the treatment or elimination of the material. The site operator must confirm that the material will be accepted and that the site is authorized to receive such materials. Provide to the CCG a copy of all shipping and reception slips pertaining to the hazardous material.
- .3 It is forbidden to decant inflammable liquids indoors.
- .4 Decant inflammable or combustible liquids away from flame or heat generating devices.
- .5 Keep as low as possible the amount of used inflammable or combustible liquids on site. The liquids shall be stored in closed, sealed and approved containers and kept in a safe and ventilated area. Label the containers in conformance with the WHMIS requirements.

- .6 Conform to the non-smoking regulations. It is forbidden to smoke where hazardous materials are handles, used or stocked.
- .7 It is forbidden to dispose of hazardous materials in a watercourse, storm sewer, sanitary sewer or a municipal landfill.

1.7 POLLUTION CONTROL

- .1 Backfill materials must be inert and exempt of harmful substances. For borrow materials, the Contractor must provide to the CCG a physicochemical analysis test results showing no contamination.
- .2 Prevent contamination of sediments, soils, air and water from fines particles or other materials.
- .3 Cover dry materials and rubbish to prevent dispersion from wind blowing. If necessary, soak the dry materials if there is no olfactory or visual sign of contamination.
- .4 Use well-maintained equipment and machinery. Regularly check for contaminant leaks and repair when necessary.
- .5 Do not unnecessarily leave trucks and heavy equipment engines on.
- .6 All heavy equipment (excavator, crane, etc.) must be inspected by a certified mechanic before the start of the work, in order to ensure that no breakage could lead to a leakage of hydrocarbons or other harmful product, and that the mufflers are in good condition. Restore non-conformities as soon as possible. Submit to the CCG an inspection certificate when necessary.
- .7 Prior to the beginning of the work, prepare a written spill contingency plan that includes a list of name, address and phone number of interveners, authorities to contact and a list of follow-up actions.
- .8 Keep suitable emergency equipment on-site in case of an accidental spill and ensure the workers know how to use the equipment if needed.
- .9 Keep an emergency-spill response kit on-site, near the work zone and near the established supplying zone. The emergency-spill response kit must contain absorbent material in adequate quantities to remove petroleum from the site.
- .10 In the event of hydrocarbon or other hazardous material spill, immediately remove the contaminants from the environment as well as the contaminated soils, and dispose of them outside of the site in compliance with the applicable legislations.
- .11 In the event of hydrocarbon or other hazardous material spill, advise the CCG and the competent authorities mentioned in the emergency plan. Report immediately to Environment Canada Emergency services (1-866-283-2333), and Environment Emergency of Québec (1-866-694-5454).
- .12 Hazardous products, wasted oil and other contaminated wastes must be managed in compliance with effective regulation. This includes on-site storage, transportation and disposal.

- .13 It is forbidden to dispose of waste or volatile materials, such as mineral spirits, oil or paint products on-site or in watercourse, storm sewer or sanitary sewer.
- .14 All hazardous waste (solvent, paint, etc.) produced on site must be disposed in a site authorized by the MDDEP.
- .15 Storage and transportation of hazardous waste must be done in compliance with effective regulations in order not to contaminate the environment.
- .16 Obtain a copy of the official authorization and permits from operator or manager of the hazardous waste-disposal site. Provide a copy of the authorization to the CCG.
- .17 Closely monitor all fuel, oil, other petroleum products or contaminants handling, including decanting, to avoid accidental spills and react promptly when necessary.

Part 2 Products

Not used.

Part 3 Execution

Not used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 33 00 — Submittal Procedures
- .3 Section 01 35 29.06 — Health and Safety Requirements
- .4 Section 01 35 43 — Environmental Procedures

1.2 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the demolition of the foundations, piers, and bollards of the obsolete equipment shelter, the demolition of the chain link fence's sections and foundations to be modify for the addition of the new fence, the dismantlement of the obsolete equipment shelter, its ice-shield and aboveground associated elements, the dismantlement of the grounding system around the obsolete equipment shelter, and the storage of the chain link fence's sections, generator and diesel tank of the obsolete shelter.
- .2 The demolition work includes, but is not limited to, the fragmentation and the sorting of the demolition debris, the handling of the recycled materials, the disposal outside of the site of the debris and materials in excess, and the excavation and backfilling required to perform the work.
- .3 The dismantlement work includes, but is not limited to, the deconstruction, disassembly, and handling of the recycled material, the disposal outside of the site of the debris and materials in excess, and all other relevant activities required to perform the work.
- .4 The storage work includes, but is not limited to, the removal and storage of the material, in addition to their restoration at the end of the work.
- .5 The dismantled or stored materials must not be deposited on moist or muddy soil. The material must be stored on wood pieces; the rows must be separated by wood pieces.
- .6 The demolition machinery used by the Contractor must not affect the structural stability and integrity of the elements to be preserved and of the other adjacent structures.
- .7 At the end of the demolition and dismantlement work, the site must be restored in accordance with the Contract Drawings and the specifications.

1.4 EXISTING STRUCTURE PROTECTION

- .1 The work must be executed in conformance with the generally accepted good engineering practices in order to avoid damages to the existing elements and materials. When required,

repair or replace the structures damaged by the demolition and dismantlement work, following the directives of the CCG.

- .2 Locate and protect all services that could be impacted by the work. The CCG's telecommunication services must not be affected by the work.

Part 2 Products

2.1 MATERIAL

- .1 The selection of material, equipment, and methods to be used for the demolition, dismantlement, or storage is the sole responsibility of the Contractor. Choices must account for the scope and work type, for the existing site conditions and the specificity of the terrain.
- .2 The demolished or dismantled materials must be disposed in an authorized site. The Contractor must ensure that the material conform to the eligibility requirement of the site. It is forbidden to bury or to leave materials on site.
- .3 The demolished or dismantled materials will become the Contractor's property.

Part 3 Execution

3.1 DEMOLITION

- .1 The demolition work must be limited to the zones necessary for the work execution.
- .2 Completely remove all demolished materials. Elements anchored in the rock must be completely removed to their bases. Levelling the elements is not permitted.
- .3 Backfill the excavations with materials conform to the specifications.
- .4 Remove and dispose, outside of the site, the demolished materials in conformity with the applicable authorities' requirements.
- .5 Keep the site clean and well-ordered during the work.
- .6 The material sorting must be done on site and directly upon the demolition process.

3.2 DISMANTLEMENT

- .1 Remove and dispose of all dismantled materials, including hardware pieces and connections related to the main elements.
- .2 Workers must use fall-prevention systems when required.
- .3 Schedule the dismantlement work in an order that will prevent collapse of the elements.
- .4 When possible, bring down the in-height assemblies to dismantle the components at ground level. Take all necessary safety measure for in-height work.

3.3 STORAGE

- .1 Store on site the materials in good condition for reuse in new construction.
- .2 Remove stored material if they interfere with the work progress.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 03 20 00 – Concrete reinforcing
- .3 Section 03 30 00.01 – Cast-in-Place Concrete

1.2 REFERENCES

- .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
CSA S269.3, Falsework for Construction Purposes.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the foundations construction of the new equipment shelter, stairways, cable tray and chain link fence.

1.4 SUBMITTALS

- .1 Submit shop drawings or data sheets for formwork and false-work, in accordance with section 01 33 00 – Submittal Procedures.
- .2 On the shop drawings, indicate the formwork construction methods and installation procedures, the formwork removal methods, the dimensions and the design data, such as permissible rate for concrete placement, temperature of concrete, etc.

1.5 QUALITY ASSURANCE

- .1 Verify the formwork before placing concrete. For each foundation, record the minimum following verifications:
 - .1 Localisation.
 - .2 Dimensions.
 - .3 Foundation elevation with respect to the Contract Drawings.
 - .4 Cleanliness and waterproofness.
- .2 The Contractor is the sole responsible of the work, including material defect, misjudgments or bad execution.

Part 2 Products**2.1 MATERIALS**

- .1 Tubular column form :
 - .1 Round, spirally wound laminated fibre forms, internally treated with release material.
 - .2 Spiral pattern to show in hardened concrete is allowed.

Part 3 Execution**3.1 FABRICATION AND ERECTION**

- .1 The Contractor must take full responsibility for the work's means and methods. The CCG's intervention does not disengage the Contractor's responsibilities, and inversely, if the CCG does not intervene, it does not mean that the Contractor's means and methods are approved.
- .2 Verify lines, levels and axis lines before proceeding with the formwork/false-work and ensure dimensions agree with the Contract Drawings.
- .3 Select and install the formwork within tolerances to obtain column dimensions, locations and levels complying with the Contract Drawings.
- .4 Ensure that anchors, rebars, and inserts do not protrude on the surfaces.
- .5 Before placing concrete, clean formwork in accordance with standards and product specifications.
- .6 Formwork shall be installed on undisturbed soils.
- .7 When forms appear to be unsatisfactory, stop the work until defects are corrected.

3.2 FORMWORK REMOVAL

- .1 Remove formwork when concrete has reached at least 70 % of its design strength or after the minimum curing period, whichever comes first.
- .2 Before backfilling, the formwork must be completely removed.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 03 10 00 – Concrete Forming and Accessories
- .3 Section 03 30 00.01 – Cast-in-Place Concrete.

1.2 REFERENCES

- .1 CAN/CSA-A23.1, Concrete materials and methods of concrete construction
- .2 CAN/CSA-A23.2, Test methods and standard practices for concrete
- .3 CAN/CSA-A23.3, Design of Concrete Structures
- .4 CSA G30.3, Cold Drawn Steel Wire for Concrete Reinforcement;
- .5 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement;
- .6 ASTM A497, Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
- .7 ASTM A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- .8 RSIC Reinforcing Steel Manual of Standard Practice.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the foundations construction of the new equipment shelter, stairways, cable tray and chain link fence.

1.4 SUBMITTALS

- .1 Submit shop drawings including the location of the reinforcement and anchors rods in accordance with section 01 33 00 – Submittal Procedures.
- .2 Indicate on the shop drawings, but without being limited to, the rebar and anchors rods list, sizes, spacing, and locations, the rebar bending details and the mechanical splices if approved.

1.5 STORAGE AND HANDLING

- .1 Ship reinforcing steel bars to the site in their original packages. The packages must have a label indicating the name and address of the manufacturer.
- .2 As per the manufacturer's recommendation, store the reinforcing steel bars in a clean and ventilated location in order to keep the reinforcing steel bars dry. Do not store the reinforcing steel bars on the ground.

- .3 Replace all damaged reinforcing steel bars by new ones.

1.6 QUALITY CONTROL

- .1 Obtain and provide to the CCG a copy of the delivery slip and a certified copy of the mill test reports of reinforcing steel.
- .2 Certify the reinforcing work before placing the concrete. Record the minimum following verifications:
 - .1 Bar type and diameter.
 - .2 Location, length, splice and concrete cover.

Part 2 Products

2.1 MATERIALS

- .1 Substitution of reinforcing steel bars by bars of different size is strictly forbidden.
- .2 Reinforcing steel bars : High adherence steel deformed bars Grade 400, except where noted otherwise.
- .3 Ligature wire : cold drawn annealed steel wire.
- .4 Chairs, shims, bar supports, spacers : comply to the applicable standards.
- .5 Anchors rods : refer to section 05 50 00 – Metal Fabrications

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field weld reinforcing steel bars except where indicated or authorized by the CCG.
- .2 The height of foundations built on rock is variable. The height of the foundation is established based on the rock elevation and the top of the foundation elevation. The final foundations' elevations must conform to these shown on the Contract Drawings. For foundations on rock, the reinforcing steel bars can be cut and field bent to obtain the required height related to the rock level.
- .3 When field bending is authorized, bend without heating, applying a slow and steady pressure.
- .4 Replace bars which develop cracks or splits.

3.2 REINFORCEMENT PLACING

- .1 Place reinforcing steel bars as indicated on the Contract Drawings.
- .2 Ensure the 75 mm concrete cover is maintained for the cast-in-place elements when placing the concrete.

3.3 ANCHOR BOLT INSTALLATION

- .1 Place the anchor bolts as shown on the Contract Drawings and according to manufacturer's specifications.
- .2 The anchor bolt projections must be protected with gummed tape before the concrete placement.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 03 10 00 – Concrete Forming and Accessories
- .4 Section 03 20 00 – Concrete Reinforcing

1.2 REFERENCES

- .1 CAN/CSA-A23.1, Concrete materials and methods of concrete construction
- .2 CAN/CSA-A23.2, Test methods and standard practices for concrete
- .3 CAN/CSA-A3000, Cementitious materials compendium
- .4 ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- .5 ASTM C78, Standard test Method for Flexure Strength of Concrete (Using Simple Beam with Third-Point Loading)
- .6 ASTM C293, Standard Test Method for Flexure Strength of Concrete (Using Simple Beam With Center-Point Loading)
- .7 ASTM C496, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the construction of the foundations of the new equipment shelter, stairways, cable tray, chain link fence, and the concrete protection on the new electrical utility pole.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 – Submittal Procedures.
- .2 Submit to the CCG the concrete mix formula approved by a certified laboratory. The formula must be dated and signed by a laboratory engineer responsible of the product quality and must mention conformity of the formula with the contract document specifications.
- .3 Obtain a recognized certificate from the concrete supplier testifying beyond reasonable doubt that aggregates to be used do not cause alkali-silica reaction. The certificate must be less than five (5) years old to be valid.

- .4 Record the procedure for the concrete consolidation, curing, protection, and finishing. Record the procedure for concreting in cold weather.
- .5 Request a laboratory to perform, during concrete placement, the following tests to ensure conformance with the specifications:
 - .1 Air entrainment rate: at least one (1) test per mixer-truck.
 - .2 Settlement: one (1) test for each cylinder for compressive resistance test and one (1) test for each 3rd air entrainment test.
 - .3 Compressive resistance: one (1) test per day per type of concrete and per 25 m³.
- .6 Provide to the CCG, for review, deviations exceeding the maximum allowable time of 120 minutes for concrete to be delivered and discharged after batching.

1.5 QUALITY ASSURANCE

- .1 Certify the concrete work. Record, for each mixer-truck, the minimum following verifications:
 - .1 Supplier name.
 - .2 Delivery number.
 - .3 Mix and formula number.
 - .4 Concrete type.
 - .5 Aggregate sizes.
 - .6 Air entrainment rate upon delivery.
 - .7 Settlement value upon delivery.
 - .8 Departure time from the plant.
 - .9 Arrival time at the site.
 - .10 Concrete placement beginning time.
 - .11 Concrete placement finishing time.
 - .12 Location of the concrete placement.
 - .13 Quantity of water added.
 - .14 Placement by vibration.
 - .15 Height of fall.
 - .16 Type and time of curing.
 - .17 Air entrained rate.
 - .18 Settlement value.
 - .19 Cylinder numbers.
 - .20 Laboratory name.
 - .21 Date and time of formwork removal.
 - .22 Conformance with the delays for formwork removal.
 - .23 Surface repairs.

Part 2 Products**2.1 MATERIALS AND COMPONENTS**

- .1 The concrete must have a minimum compressive resistance of 30 MPa after 28 days. It must comply with the requirement for exposed saturated conditions.
- .2 The concrete mix must comply with the requirements of all applicable standards:
 - .1 Type 10 Portland cement.
 - .2 Water with no traces of oil, acid, alkali, chloride, organic material or any other deleterious substances.
 - .3 Coarse and fine aggregates of normal density and of nominal maximum size of 20 mm.
 - .4 Air entrainment rate between 4 % et 7 %.
 - .5 Settlement between 75 and 125 mm.
- .3 Usage of calcium chloride admixture is forbidden.
- .4 Fresh and clean potable water must be used for mixing.
- .5 At all time, the Contractor must ensure the compatibility of the products.
- .6 At all time, the supplier's recommendations must be followed.

Part 3 Execution**3.1 CONCRETE TRANSPORT AND HANDLING**

- .1 Transportation and handling must comply with the following time limits:
 - .1 When the concrete is transported by a mixer-truck, the maximum time between the truck loading and the concrete placement must be less than 90 minutes assuming that the concrete is continually mixed.
 - .2 When the concrete is transported in a non-mixer-truck, the maximum time between the truck loading and the concrete placement must be less than 45 minutes.
- .2 It is forbidden to add water during the transportation from the plant to the site. It is also prohibited to add water to concrete before emptying from the mixer-truck, unless the laboratory gave the authorization. In this case, the added water quantity shall be written on the delivery slip and certified by the laboratory representative who will sign the slip.

3.2 WEATHER CONDITIONS

- .1 Concreting shall not be allowed if the ambient temperature exceeds 27 °C or is inferior to 5 °C.
- .2 Concrete shall be mixed and delivered between 15 °C and 30 °C.

3.3 CONCRETE PLACEMENT

- .1 Concrete must be placed on dry surfaces. The Contractor must plan the necessary equipment for the dewatering of the excavations before and during the work.
- .2 Concrete must be placed on undisturbed and unfrozen soils/rock.
- .3 The axial horizontal tolerance between any 2 foundations is 5 mm.
- .4 The maximum level difference at the top of any 2 foundations is 5 mm.
- .5 The dimensional tolerance of any foundation is -5 mm to + 10 mm.
- .6 The Contractor must ensure that the reinforcing bars and the inserts do not moved during the concrete placement.
- .7 The anchor rod projections must be protected with gummed tape before the concrete placement.
- .8 The maximum concrete height of fall is 1.5 m.
- .9 Dry cement must not be spread over the surface to absorb excess humidity. Excessive trowelling must also be avoided.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures

1.2 REFERENCES

- .1 ASTM A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength..
- .2 ASTM A394, Standard Specification for Steel Transmission Tower Bolts, Zinc-Coated and Bare.
- .3 ASTM A500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .4 ASTM A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .5 ASTM A563, Standard Specification for Carbon and Alloy Steel Nuts.
- .6 ASTM A6, Standard Specification for general Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
- .7 ASTM A653, Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .8 CAN/CSA F436, Standard Specification for Hardened Steel Washers
- .9 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- .10 CAN/CSA-G40.21, Structural Quality Steels.
- .11 ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .12 CAN/CSA-S16.1, Limit States Design of Steel Structures.
- .13 CAN/CSA W47.1, Certification of companies for fusion welding of steel.
- .14 CAN/CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
- .15 CAN/CSA W59, Welded Steel Construction (Metal Arc Welding).

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the materials, equipment, workmanship, and metallic finish for the cable tray, new shelter's anchors connection plates, anchors rods, assembly steel hardware, utility post's protective metallic plate, and all steel pieces required for the project.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings showing the necessary information for the fabrication and assembly of steel pieces as well as quantities of material to be used. Shop drawings must be signed and sealed by the manufacturer's engineer.
- .3 Submit a written description of the welding methods in conformance with engineering good practices and references of this specification.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Handle steel pieces in order to avoid permanent deformations.
- .2 Handle with care the steel pieces with a special shop-applied coating.
- .3 Do not deposit the material on moist or muddy soil. The material must be stored on wood pieces; the rows must be separated by wood pieces.

1.6 QUALITY ASSURANCE

- .1 Allow the CCG to perform inspection at the fabrication, assembly, or erection shops.
- .2 Upon delivery, the Contractor must proceed to the inspection of the steel pieces and report any defect. The Contractor is entirely responsible of all damaged pieces, galvanization defects, missing pieces, etc. before and throughout the construction work.
- .3 Report to the CCG any problem with the material or field assembly. The corrections, if needed, must be made to the CCG's satisfaction.

Part 2 Products**2.1 MATERIAL**

- .1 In the case of discrepancies between this specification and the Contract Drawings, the information shown on the Contract Drawings will prevail. Notify the CCG of any found discrepancies.
- .2 Refer to the Contract Drawings for more information on the steel grade for each type of element.
- .3 All steel elements are galvanized and not painted, except where noted otherwise.
- .4 The welding electrodes must be compatible with the base material.

2.2 GALVANIZATION

- .1 Comply with the CAN/CSA G164, (600g/m²) hot dip galvanizing.
- .2 All damaged or scaled galvanized surfaces must be repaired with an epoxy base coat.

Part 3 Execution**3.1 METALLIC ASSEMBLIES**

- .1 The fabricated assemblies must be square, true, straight, and of the required size, with joints closely fitted and properly secured.
- .2 When possible, the structures must be adjusted and assembled in the shop and delivered ready for the erection.

3.2 GALVANIZATION

- .1 Preparation for galvanization: clean with acid after pickling at half-white.
- .2 Clean and prepare surfaces in order for the galvanizing zinc coat to bond perfectly to all surfaces.
- .3 The elements must be completely fabricated before galvanization. Galvanizing bath must be sufficiently large for the items to be galvanized in only one dip.
- .4 Hot-dip galvanize the elements to obtain a continuous layer of uniform thickness to ensure a complete steel protection after erection.
- .5 Welding is not allowed after galvanization.
- .6 Avoid strain, warping or deforming of the elements during galvanization.
- .7 Any deformed or warped element will be rejected, unless the Manufacturer rectifies the item in such a way that neither the piece nor the galvanization is damaged.

3.3 ERECTION

- .1 Before proceeding with the erection, the Contractor must revise, with his engineer, the installation methods to account for the existing site conditions. The adjustments, if any, must be noted (in writing) on the revised installation procedure.
- .2 Install the fabricated assemblies in such a way to be square, true, straight, and of the required size, with joints closely fitted and properly secured.
- .3 Provide and install the elements in compliance with the standard name scheme and the submitted shop drawings.
- .4 Bolt the elements on site with hardware complying with the applicable standards. Field welding is not allowed.
- .5 The use of a blowtorch to correct errors or to create holes is not allowed. All field holes must be drilled.
- .6 Any damage to galvanized surfaces (including perimeter of field drilled holes) must be repaired with an epoxy base coat approved by the CCG.
- .7 Bolt holes tolerances: Match holes for bolts in order to freely pass a gauge that is 2 mm smaller in diameter than the holes, through all assembled parts, at a right angle.

3.4 INSERTS

- .1 Coordinate the fabrication of inserted elements to match with the encasement pieces. Ensure that the inserts are delivered following the sequences of the concrete placement.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 Refer to the Standard Contract Drawings: 091152-B036-MALT-01 and 091152-B036-MALT-02.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the materials and equipment, the labour, the installation of the underground grounding conductor and enhancement material, the connections to the existing tower grounding system, the backfilling of the trenches, the tests and verifications for the grounding of the new equipment shelter, cable tray, exterior line entrance, chain link fence, etc.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 – Submittal Procedures.

Part 2 Products**2.1 MATERIALS AND EQUIPMENT**

- .1 In the case of discrepancies between the contractual documents, the precedence order should be as follow : contracts and general conditions, technical specifications, contract drawings. Notify the CCG of any found discrepancies.
- .2 The materials must be as shown on Contract Drawing's bill of material. No substitution will be allowed.

Part 3 Execution

3.1 INSTALLATION

- .1 Before proceeding with the work, the Contractor must revise, with his engineer, the installation methods and the material quantities to account for the existing site conditions. The adjustments, if any, must be noted (in writing) on the revised installation procedure.
- .2 At locations shown on the Contract Drawings, the grounding conductor must be covered by a ground enhancement material and a metallic wire mesh before backfilling in conformance with section 31 23 33.01 – Excavating, Trenching and Backfilling

3.2 QUALITY ASSURANCE

- .1 All alumino-thermic “CADWELD” connections must be tested. The Contractor shall provide all material necessary for the testing. A summary of the results, including a confirmation of compliance must be provided to the CCG or included on the “as-built” drawings.
- .2 The Contractor must notify the CCG before the installation of the ground enhancement material and before the backfilling of the trenches, to obtain the confirmation that the conductor’s connections are adequate.
- .3 The Contractor must perform a grounding system resistivity tests. Should result be unsatisfactory, the CCG will notify to the Contractor the additional work that must be undertaken. A summary of the results, including a confirmation of compliance must be provided to the CCG or included on the “as-built” drawings.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 ASTM D4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2 ASTM D6938 - 10 Standard Test Method for In Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth)
- .3 CAN/BNQ 2560-114, Travaux de génie civil – Granulats
- .4 CAN/BNQ 2560-500, Granulats - Détermination de l'indice pétrographique du potentiel de gonflement sulfatique des matériaux granulaires – Méthode d'essai pour l'évaluation de l'IPPG.
- .5 CAN/BNQ 2560-510, Granulats - Guide d'application de la méthode d'essai pour la caractérisation du potentiel de gonflement sulfatique des matériaux granulaires.

1.3 SUBMITTALS

- .1 The contractor must provide certificates (purchase orders) confirming that the aggregate material conforms to the specification.

Part 2 Products**2.1 MATERIALS**

- .1 Aggregate quality: sound, hard, durable, free from soft, thin, elongated or laminated particles, organic material, clay lumps, minerals, or other substances that would act in deleterious manner against the intended use.
- .2 Produce and use aggregates as specified below.
 - .1 Granular material of "MG-20" type for the finishing layer, as shown on the Contract Drawings.
 - .2 Granular material of "CG-14" type for the foundations' embankment, as shown on the Contract Drawings.
 - .3 20 mm clean stone for the finishing layer within the site compound area, around the equipment shelter, and up to 1 m outside of the fence, including the turning area and access road. Refer to the Contract Drawings.

Part 3 Execution**3.1 AGGREGATES PREPARATION**

- .1 Handle, transport and process the aggregates using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregates, if required, to obtain grading, percent of crushed particles, or particle shapes as required.
- .3 Wash aggregates, if required to meet the specifications.

3.2 AGGREGATE STOCKPILLING

- .1 Stockpile aggregates on site at predefined locations. Do not stockpile on paved surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet the project schedule.
- .3 Stockpiling areas must be leveled, well drained, and of adequate bearing and stability capacity to support stockpiled materials and handling equipment.
- .4 Except where stockpiling on a stabilized area, provide compacted sand base of not less than 300 mm thickness to prevent contamination of the aggregates. Stockpile aggregates on ground but do not use the bottom 300 mm.
- .5 Separate the different aggregates by strong, full depth bulkheads, or stockpile the different aggregates far enough to prevent intermixing.
- .6 It is forbidden to use intermixed or contaminated materials. Remove and dispose of the rejected materials within 48 hours of their rejection. Respect all applicable regulations.
- .7 Stockpile materials in uniform layers of thickness less than 1500 mm.
- .8 Uniformly spot-dump the aggregates and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 It is forbidden to use conveying stackers.

3.3 CLEANING

- .1 Leave the aggregate stockpile areas in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles. At the end of the work, dispose of the unused material in an authorized site and respect all applicable regulations.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 SECTION SCOPE OF WORK (IF APPLICABLE)

- .1 This section describes and includes, but is not limited to, clearing and grubbing of the telecommunication site where the new equipment shelter and fence will be installed or relocated.
- .2 The Contractor can clear larger areas than those shown on the Contract Drawings to ease the installation work and protect the existing facilities. The zones must however stay within the property limits.

1.3 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.

1.4 DEFINITION

- .1 Clearing : cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Close-cut clearing : cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Underbrush clearing : removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm in trunk diameter and disposing of fallen timber and surface debris.
- .4 Grubbing : excavation and disposal of stumps, roots, boulders and rock fragments of specified size to not less than specified depth below existing ground level.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Sort waste in conformity with section 01 35 43 - Environmental Procedures.
- .2 The Contractor must dispose of the waste in a site authorized by the CCG. Obtain an acceptance document from the site operator. This document must confirm the site operator's approval to receive materials or waste carried to his site.
- .3 Sort and trim limbs and tops that could be used for saw logs, pulpwood, poles, ties, and fuel wood.
- .4 It is forbidden to burn or burry waste on site.

Part 2 Products

- .1 Not used.

Part 3 Execution**3.1 EQUIPMENT**

- .1 The Contractor must supply all material and equipment necessary to perform the clearing and grubbing work.

3.2 CLEARING

- .1 Clearing includes felling, trimming and cutting of trees into sections and disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish in cleared areas.
- .2 Clear by cutting at height of not more than 300 mm above ground.
- .3 Cut off branches and cut down trees overhanging the cleared areas.
- .4 Preserve areas outside of the clearing zone. Trees falling outside of the clearing areas must be avoided. Temporary storage of cut trees must be within the cleared area to prevent damages to areas not touched by the clearing work.

3.3 UNDERBRUSH CLEARING

- .1 Clear underbrush areas as indicated, at ground level.

3.4 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and stumps from the indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground level.
- .3 Remove visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .4 Fill holes made by grubbing with suitable material in conformity with section 31 23 33.01 – Excavating, Trenching and Backfilling.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 35 29.06 – Health and Safety Requirements
- .4 Section 01 35 43 – Environmental Procedures
- .5 Section 31 05 16 – Aggregate Materials
- .6 Section 31 11 00 - Clearing and Grubbing
- .7 Geotechnical investigation report

1.2 REFERENCES

- .1 ASTM C117, Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
- .5 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
- .6 ASTM D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
- .7 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .8 ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .9 ASTM D2922, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- .10 CAN/BNQ 2501-255, Soils - Determination of the Water-Density Relation - Modified Effort Compaction Test (2700 kN.m/m³)
- .11 CAN/BNQ 2560-114, Travaux de génie civil – Granulats.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, excavating and backfilling work for activities related to the installation of a new equipment shelter and its grounding system, the removal of the obsolete equipment shelter and its grounding system, the modification of the fence's foundations and the installation of an electrical utility pole and new underground conduits.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.

1.5 DEFINITION

- .1 Two classes of excavation will be recognized:
 - .1 Rock excavation: any solid material in excess of 0.25 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 m³ to 1.15 m³ bucket. Frozen materials are not classified as rock.
 - .2 Common excavation: excavation of materials of nature different than rock excavation.
- .2 Topsoil : Material able to support good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 Waste material: excavated material unsuitable for use in the work or in surplus.
- .4 Borrow material: material imported from outside of the site, and required for the construction of fill areas or for other portions of the work.
- .5 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials.
 - .1 Fine grained soils with plasticity index less than 10 and grading within limits specified in the Standards. Sieve Designation must be conform to the Standards.
 - .2 Coarse grained soils containing more than 20 % by mass passing the 0.075 mm sieve.

1.6 DELIVERY, STOCKPILING AND HANDLING

- .1 Deliver and stockpile borrow materials in conformity with section 31 05 16 – Aggregate materials.
- .2 Stockpile materials in pre-approved locations. Use methods preventing material segregation.
- .3 Before beginning backfilling work, stockpile at least 50% of all required aggregates.
- .4 Protect borrow materials from contamination.

- .5 Take appropriate measures to prevent washout and sediment migration off-site.

1.7 QUALITY ASSURANCE

- .1 During backfilling operations, the Contractor must ensure that compaction levels specified for the granular materials are conform to the specifications on the Contract Drawings. Density tests must be performed by the Contractor's geotechnical laboratory.

1.8 PROTECTION OF THE EXISTING STRUCTURES

- .1 Prior to beginning the excavation of the underground utilities and structures, notify the CCG, perform the utilities locates and determine the state of the existing systems.
- .2 Confirm the underground utilities locations by performing careful test excavations.
- .3 Maintain and protect the electrical utilities, telephone utilities and other structures encountered.
- .4 Where utilities or structures exist in area of excavation, obtain the CCG's authorization before re-routing.
- .5 Conduct a condition survey of existing buildings, trees and other plants, lawns, fencing, utility poles, wires, pavement, survey bench marks and leveling monuments which may be affected by the work.

Part 2 Products

2.1 MATERIALS

- .1 Backfilling material "CG-14" can be replaced by the excavated materials only if authorized from the geotechnical investigation.
- .2 Borrow material : type "MG-20" and "CG-14" as defined in Standard NQ 2560-114 Travaux de génie civil – Granulats and 20 mm clean stone in conformity with the Standards.
- .3 The CCG reserves the right to sample and test stockpiled aggregates. If test results indicate that materials are non-conform, the CCG will reject the materials. The aggregates are accepted when they are in conformity with all of the specifications.

Part 3 Execution

3.1 PREPARATION

- .1 Keep the excavations clean and dry at all time during the work.
 - .1 Locate all underground conduits including grounding conductors in the excavation areas.
 - .2 Use survey bench marks and locate axial foundations lines in relation to the existing structures. Report all discrepancies.

3.2 TOPSOIL STRIPPING

- .1 Remove and dispose outside of the site of brushes, lawn, and weeds in conformity with section 31 11 00 - Clearing and grubbing.
- .2 Remove topsoil on top of rock.
 - .1 Do not mix topsoil with subsoil.
 - .2 Stockpile topsoil only in locations previously established.
 - .3 Stockpile height must not exceed 2 m and must be protected from erosion action.
 - .4 Dispose of unused topsoil in location authorized by the CCG.

3.3 EXCAVATION

- .1 Coordinate with section 01 35 29.06 – Health and Safety Requirements.
- .2 Ensure the stability of the underground conduits, cable trays or duct banks located near the work zones.
- .3 Rock excavation must be performed using a pneumatic hammer or any other mechanic method approved by the CCG. Consider the following:
 - .1 The peak particle velocity, from any directions measured on equipment supports or panels in shelters, must not exceed 15 mm/s;
 - .2 The Contractor must have the adequate tools to measure the vibrations' velocity. A copy of all the recordings must be transferred to the CCG.
- .4 The use of dynamite or any other explosives is strictly forbidden.
- .5 Excavation work must not interfere with the bearing capacities of the adjacent foundations.
- .6 Keep excavated and stockpiled materials at a safe distance from the edge of trenches and excavations.
- .7 Restrict motorised vehicle operations in the vicinity of open trenches.
- .8 Use removal procedures that produce uniform and stable excavation surfaces. Minimize overbreak, and avoid damage to adjacent structures.
- .9 Limit trench width to the minimum required to perform the work.
- .10 Excavations exceeding the depth specified on the Contract Drawings must be rectified to the specified base level.
- .11 Tolerances on excavation bottom levels are +10 mm to – 80 mm.
- .12 Remove boulders and fragments which may slide or roll into the excavated areas.

- .13 Level and compact the excavations' bottom. The bearing surfaces must be horizontal and uniform. Loose or weakened rock and protrusion must be removed. Refer to the geotechnical investigation report recommendations.

3.4 BACKFILL MATERIAL AND COMPACTION

- .1 Use fill materials as indicated or specified below. Compaction densities are rates of maximum densities obtained from the applicable Standards.
 - .1 Backfill with granular material of "MG-20" type the exterior finishes as indicated on the Contract Drawings. Compact to 95% of corrected maximum dry density obtained by the Modified Proctor.
 - .2 Backfill with granular material of "CG-14" type the base layers as indicated on the Contract Drawings. Compact to 95% of corrected maximum dry density obtained by the Modified Proctor.
- .2 Perform compaction work on materials at a temperature over 0°C.
- .3 If natural soil or an already compacted material layer undergoes, before the end of the Contract, a density loss due to equipment traffic, weather, freeze-thaw action or any other cause, the Contractor must compact again to the specified density.
- .4 If the thickness of a material layer specified on the Contract Drawings is less than 300 mm, it has to be spread and compacted separately. It is prohibited to compact, at the same time, two layers of different material type.
- .5 Shape and roll one after the other to obtain smooth, even and uniform compacted layers.
- .6 Add water as necessary during compaction to obtain the required densities.
- .7 In areas not accessible to rolling equipment, compact to the specified density with mechanical tampers approved by the CCG.
- .8 Correct surface irregularities by loosening, adding or removing materials until the surface be within the specified tolerances:
 - .1 Finished surface to be within ± 10 mm of established grade and cross section but cannot be uniformly high or low.
- .9 Maintain the finished layer in condition conforming to the specification until succeeding material is applied.

3.5 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of the following :
 - .1 The CCG has inspected and approved the installations.
 - .2 Inspection, testing and approval of the underground utilities' locations.
 - .3 Removal of concrete formwork.

- .2 Areas to be backfilled must be free from debris, snow, ice, water and frozen soils.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to the indicated levels. Compact each layer up to the required density before placing the following layer.
- .5 Place the finishing exterior material (clean stone 20 mm) in uniform layers not exceeding 100 mm compacted thickness.
- .6 Backfill with borrow granular materials in such a way to prevent segregation or degradation.
- .7 Backfilling around installations :
 - .1 Place bedding and backfill material as described in the specifications.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours of concrete placing.
 - .3 Backfill simultaneously on both sides of the installation to counterbalance loads.
- .8 Use spreader boxes fitted with adjustable templates or screeds to ensure materials are placed in uniform layers of the required thickness.
- .9 Remove, dispose and replace all materials of a layer if material segregation occurred during backfilling.

3.6 RESTORATION

- .1 Upon completion of the work, remove waste materials and debris, trim slopes, and correct defects as directed by the CCG.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 02 41 16 – Structures Demolition
- .3 Section 03 30 00.01 - Cast-in-place concrete

1.2 REFERENCES

- .1 ASTM A121, Standard Specification for Metallic Coated Carbon Steel Barbed Wire.
- .2 CAN/CGSB-138.1, Fabric for Chain Link Fence.
- .3 CAN/CGSB-138.2, Steel Framework for Chain Link Fence.
- .4 CAN/CGSB-138.3, Installation of Chain Link Fence.
- .5 CAN/CGSB-138.4, Gates for Chain Link Fence.
- .6 ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the supply, installation, modification and restoration of the chain link fences and gates.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

- .1 The Contractor must certify the installation work of the fence and the minimum following verifications must be written in the inspection report:
 - .1 Localisation
 - .2 Materials conformity: diameter, type, grade, length, galvanization, fence fabric.
 - .3 Barbed wires and fence fabric direction.
 - .4 Clip distribution.
 - .5 Fence fabric lower level.
 - .6 Buried fence fabric.
 - .7 Gate type.

Part 2 Products**2.1 MATERIALS**

- .1 The chain link fence fabric must conform to Standard CAN/CGSB-138.3-96 and must respect the following :
 - .1 Galvanized fence fabric
 - .2 Height of fabric 2133 mm
 - .3 Fabric gauge steel : 4 mm diameter
 - .4 Mesh size : 50 mm
 - .5 Include 3 barbed wires
 - .6 Continuous over its height and length
- .2 Frame:
 - .1 Posts, braces and rails: to CAN/CGSB-138.2, standard galvanized steel pipe. The mass per unit area of zinc coating must be at least 550g/m², type F with non-threaded ends in conformance with ASTM A53.
 - .2 Bottom tension wire : single strand, galvanized, 5mm
 - .3 End, corner, and gate posts must be of 89 mm outside diameter and 5.49 mm wall thickness. Line posts must be of 60.3 mm outside diameter and 3.91 mm wall thickness.
 - .4 Top rail must be of 42.2 mm outside diameter and 3.56 mm wall thickness. All fittings and fasteners required for the installation must also be provided.
 - .5 Braces at fences extremities must be provided with a steel pipe brace of 42.2 mm outside diameter and 3.56 mm wall thickness. All bracing to be installed at angle from the top towards the bottom of the adjacent post.
- .3 Gates:
 - .1 Frame and bracing pipes must be of 42.2 mm outside diameter and 3.56 mm wall thickness. The mass per unit area of zinc coating must be at least 550g/m², be of type F with non-threaded ends in conformance with ASTM A53.
 - .2 Bracing shall be half-moon cut and welded.
 - .3 Pedestrian door (1 500 mm) must consist of 2 sections; 1/3 for the inferior part and 2/3 for the superior part. Refer to contractual drawings for details.
 - .4 The vehicle gate must be of width 5000 mm. Each section must be composed of a bracing in tension in addition to a vertical and horizontal bracing at mid-span. Refer to contractual drawings for details.

- .5 Each section of the gates are to be supplied with galvanized malleable iron hinges, latch and latch catch. Gate latches are to be suitable for a padlock which can be attached and operated from either side of gate. Hinges are to permit gate to swing back against the fence at 180 degree.
 - .6 Frame posts shall be extended to accommodate three strands of barbed wire.
 - .7 Provide a centre rest (with concrete footing) with a foot bolt. **(Refer to the Contract Drawings).**
 - .8 Provide required check hooks.
- .4 Concrete footings:
- .1 The footings shall be cylindrical. Diameters to be as shown on the Contract Drawings. Footing depth shall be at least 1950 mm or more if the frost depth requires so, with tolerance of + 75 mm to - 0 mm. Footing can be longer than 1950 mm, but never shorter.
 - .2 Footing shall be finished with a convex slope (± 25 mm).
 - .3 On sound rock, install to a minimum depth of 350 mm for line posts and 400 mm for end posts
- .5 Fittings and hardware shall be made from aluminum alloy, galvanized steel, or malleable iron.
- .6 Clips : single strand, aluminum or galvanized steel (conform to the specification of the fence fabric), at least 4 mm.
- .7 Truss rod : galvanized steel, minimum section of 5 mm x 20 mm.
- .8 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
- .9 Extension arms for barbed wires: galvanized cast iron or aluminum are to be provided for line, corner and straining posts. The supports shall be provided with self-blocking recesses or fixing clips to hold 3 strands of barbed wire.
- .10 Barbed wires shall conform to the specifications of Standard CAN/CGSB-138.2. The wire shall be grade 12 ½ “extra strength” (2.51 mm diameter). The barbs shall be 4-point construction, spaced at 150 mm and be galvanized (class 3, 245g/m²).
- .11 Damaged galvanized surfaces shall be cleaned per the requirements of Standards SSPC-SP2 or SP3 prior to applying a zinc-rich compound. Follow the manufacturer’s specification for the application of the compound.
- .12 Finishes and galvanizing:
- .1 For pipe: 550 g/m² minimum to ASTM A90
 - .2 For other fittings: to ASTM A123

Part 3 Execution**3.1 GRADING**

- .1 Remove debris and level the ground along the fence axis to obtain a smooth and uniform gradient between the posts.
 - .1 Plan a 30 mm to 50 mm clearance between the bottom of the fence and the ground surface.

3.2 INSTALLATION OF FENCE AND GATE

- .1 Install the fence and gate along the axis line as indicated by the CCG on the contract drawings. Ensure square corners.
- .2 Excavate post holes to dimensions and location shown on the contract drawings. Finish in a bulb shape the excavation's bottom of the end, corner, gate, and line posts.
- .3 Place concrete in post holes then embed posts into concrete to obtain an above ground height of 2 133 mm. Extend concrete 25 mm above ground level and slope to drain away from posts. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set. The stability of the fence is the Contractor's responsibility.
- .4 Install fence fabric after concrete has cured, minimum of 48 hours.
- .5 Grout shall be used for foundation on rock and must contain the following:
 - .1 Expansive agent (to be used per manufacturer's specifications)
 - .2 Cement
 - .3 Clean medium sand (per general specifications)
 - .4 Clean water
 - .5 Water/cement ratio of 0.40 maximum
- .6 Grout shall be install before each post. Finish with a convex slope.
- .7 The clear distance between an end or gate post and an obstruction (like a wall), shall be less than 60 mm. Where this distance cannot be met, the Contractor shall obtain the CCG's authorization.
- .8 Install brace between end and gate posts and nearest line post, placed in centre of panel. Install braces on both sides in a similar manner.
- .9 Install top rail between posts and fasten securely to posts with waterproof caps.
- .10 Install the bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with drop forged steel turnbuckles and tension bar bands.
- .11 The clear height between the bottom of the fence fabric and the finished ground level shall be less than 50 mm. The tolerance on the alignment is less than 10 mm from the information shown on the Contract Drawings. The vertical deviation shall be less than 5 mm at the post's top. Post shall be centered on the footing, with a 10 mm tolerance. Tolerance for post spacing

is less than 50 mm. The final top height of all post shall be identical. The barbed wires, including at the gate, shall also all be leveled.

- .12 Install the fence fabric on the outside of the line posts. Fasten to end posts with tension bar secured to post with galvanized steel tension bar bands. Secure fabric with tie wires at :
 - .1 Line posts at 300 mm intervals
 - .2 Top rail at 450 mm intervals
 - .3 Truss rod and tension wire at 400 mm intervals
- .13 The 5000 mm gate's centre rest shall have its own footing : see annexed drawing. The assembly plate/drop bolt shall be deposited on the footing during the concrete placement to obtain perfect adherence. This footing shall be cylindrical and of 300 mm diameter, with a minimum depth of 1 950 mm. The rebar shall be located to avoid conflict with the drop bolt. On rock, the footing shall be cylindrical, with a 200 mm diameter.
- .14 The top rails shall be installed with galvanized sleeves fitting and shall pass through the caps of line posts. When long spans are installed, plan for the effects of dilatation and shrinkage such as not to cause deterioration to the assembly. Fix to each end post with a socket fitting.
- .15 Extension arms shall be inclined at 45° towards the outside of the compound area.
- .16 Barbed wires shall be fixed to end posts with tension bands and to gate posts with eye-bolts.
- .17 The bottom tension wire shall be installed and stretched a mid-height of the last mesh row. Secure the wire to the fabric at each 400 mm. Fix to the end post by wrapping around the post and then twisting on itself.
- .18 The gate shall be mounted on hinges. The top and bottom pivot rods shall be oriented upward and the central pivot rod downward. Hinges shall have sufficient rigidity and shall be tighten enough to ensure the gate operates without deformation and damage to the galvanization.
- .19 Install the gates in 2 sections as shown on the Contract Drawing. Set the gate bottom at 50 mm above ground surface. Remove all obstacles around the openings.

3.3 RESTORATION

- .1 Repairs :
 - .1 Repair the damaged galvanized surfaces. Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of zinc-rich compound.
 - .2 Straighten out or replace the bent posts.
 - .3 Replace or reinstall the fence fabric or barbed wires missing or damaged.
 - .4 Proceed with all other necessary repair to ensure the access to the compound area is adequately restrained.
- .2 Restore the worked areas at the end of work.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 CAN/CSA C22.1, Canadian electrical code, part I (22nd edition), safety standard for electrical installations.
- .2 CAN/CSA C22.2 NO. 211.1 — Rigid Types EB1 and DB2/ES2 PVC Conduit
- .3 CAN/CSA-B1800 Thermoplastic nonpressure piping compendium consisting of B182.1 - Plastic Drain and Sewer Pipe and Pipe Fittings.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but it not limited to, the supply, installation and preparation of underground cable conduits and associated elements for electric power and telephone supply between the utility post and the new CCG's equipment shelter.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product literature, specifications and data sheets, including product characteristics, performance criteria, physical size, finish, limitations, work and cleaning methods, etc.

1.5 QUALITY ASSURANCE

- .1 Notify the CCG before backfilling to allow for the underground conduits' inspection.
- .2 Certify the underground conduit work before backfilling. Record, for each conduit, the minimum following verifications:
 - .1 Conduits and ends location.
 - .2 Length of each conduit (measures must be performed with a graduated rope).
- .3 Conduits type and diameter.

Part 2 Products

- .1 Materials must be as indicated on the Contract Drawings.

- .2 The Contractor must supply all materials for the construction of underground conduits including, without being limited to, PVC conduits of type "DB2", couplings, reducers, bell end fittings, plugs, caps, adaptors, treated wood, indicator tape, etc.
- .3 All fittings must be fixed using the appropriate solvent in order to make a complete and continuous assembly.
- .4 A 6 mm stranded nylon pull rope with a minimum tensile strength of 5 kN must be installed in each conduit.
- .5 Use, if possible, pre-treated wood products with lesser environmental impacts, like those pressure-treated with water based preservatives.

2.2 INSTALLATION

- .1 Install conduits following the manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .2 Install the conduits at the elevations indicated on the Contract Drawings. Underground conduit location tolerance is ± 50 mm.
- .3 Elbows must have a one (1) meter minimum radius.
- .4 All joints must be sealed before being connected to obtain a waterproof connection.
- .5 Clean the inside of conduits before their installation.
- .6 Incline the conduits with a 1 to 400 minimum slope, starting from the high point at the utility pole.
- .7 Install plugs at both ends of the conduits to prevent ingress of foreign materials during and after construction.
- .8 Install a pull rope throughout each conduit with 3 m spare length at each end.
- .9 Cleaning and sealing of conduits after installation work must be done with a stiff bristle brush and a mandrel.
- .10 During backfilling, install at levels indicated on the Contract Drawings, pre-treated wood and indicator tapes.
- .11 During and after the backfilling work, ensure that the conduits do not move.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 31 05 16 – Aggregate Materials
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .4 Section 33 65 76 – Direct Buried Underground Cable Ducts

1.2 REFERENCES

- .1 CAN/CSA-O80, Wood Preservation.
- .2 CAN/CSA-O15, Wood Utility Poles and Reinforcing Stubs.
- .3 CAN/CSA O116, Power and Communication Sawn Wood Crossarms.
- .4 CAN/CSA C83-96- Communication and Power Line Hardware.
- .5 CAN/CSA C22.10 Québec Construction Code, Chapter V – Electricity.

1.3 SECTION SCOPE OF WORK

- .1 This section describes and includes, but is not limited to, the supply, installation and coordination of the connections to an electrical utility post and to the associated elements, including hook-up masts for the power supply of the new CCG's equipment shelter.
- .2 The Contractor is the sole responsible for obtaining authorizations and permits from Hydro-Québec for the power supply of the temporary shelter and of the new shelter. If necessary, the Contractor must coordinate the work with Hydro-Quebec and hires a subcontractor to perform the work.

1.4 SUBMITTALS

- .1 Submit documents in accordance with section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's specifications and data sheets and include product characteristics, performance criteria, physical size, finishes, limitations, etc.
- .3 Indicate, without being limited to, the following information on the shop drawings :
 - .1 Materials and equipment.
 - .2 Anchorage method.
 - .3 Anchors quantity.
 - .4 Supports.

- .5 Reinforcement.
- .6 Assembly details.
- .7 Accessories.

1.5 QUALITY ASSURANCE

- .1 Submit certificates signed by the manufacturer attesting that the materials comply with the required performance levels and physical properties.
- .2 Conform to the manufacturer's instructions and special handling criteria, installation sequence, cleaning procedures, etc.
- .3 All electrical work must be performed by a master electrician.

Part 2 Products

- .1 The wood pole must be 35' long and of class 7. Use, if possible, pre-treated wood products with lesser environmental impacts, like those pressure-treated with water based preservatives.
- .2 All other materials and elements (hook-up masts, concrete protection, clips, cables, etc.) must be conform to Hydro-Québec's Standards.

Part 3 Execution

3.1 INSTALLATION

- .1 Install the wood utility pole, underground conduits, concrete protection and metal cover as indicated on the Contract Drawings.
- .2 The wood pole must be encased at a depth of 1830 mm below grade level.
- .3 Plan Hydro-Québec's electrical connection point to the new wood pole. Coordinate the connection with the CCG and Hydro-Québec.

END OF SECTION