

Fisheries and Oceans Canada
Electric Vehicle Supply Equipment
for the Maurice-Lamontagne Institute
Site

Project No.: 2180C

SPECIFICATION
Issued for Tender

Civil / Electrical



Prepared for:

Fisheries and Oceans Canada

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March 26, 2021

O/Ref.: 152700659-GN-S-0001-0

Fisheries and Oceans Canada

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SIGN-OFF SHEET

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RECORD OF REVISIONS AND ISSUES

Revision No.	Date	Description of the modification and/or of the issue
0	2021-03-26	Issued for Tender "This document shall not be used for Tender nor Construction"

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CI04	CUTS AND DETAILS
CI05	FRENCH SPECIFICATIONS
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END OF SECTION

DIVISION 01

General Requirements

PART 1 - GENERAL

General Note : for the purpose of these specifications, the term "site" refers to all the facilities located in or near the work area where the work is being carried out (the work site itself, accesses, infrastructures, parking lots, docks, etc.).

1.1 RELATED REQUIREMENTS

- .1 All of this specification.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work under this contract includes, but is not limited to, the installation of new electric charging stations, located and designated.
- .2 Location of the work: Maurice Lamontagne Institute, located at 850, route de la Mer, Saint-Flavie, Quebec.
- .3 This summary of the work is not necessarily complete and does not relieve the Contractor the Contractor from its responsibility to perform any other work, change or modification necessary to complete the work to the satisfaction of the Departmental Representative.
- .4 For the scope of all work, refer to the plans and specifications, as these specifications do not as these specifications do not specify in detail the nature of all work required. required.
- .5 All work shall be performed in accordance with applicable regulations and in accordance with applicable regulations and in compliance with the plans and specifications relating to this contract.
- .6 It is the Contractor's responsibility to obtain all documents referred to in these mentioned in these specifications.
- .7 In the event of any discrepancy between the various contract documents, the order of precedence shall be precedence is as follows:
 - .1 Addenda;
 - .2 The slips;
 - .3 Plans;
 - .4 Small scale drawings;
 - .5 Specific Specifications;
 - .6 Generic Specifications;

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1.3 BRIEF DESCRIPTION OF THE WORK

- .1 This project mainly consists of electrical and civil works to be carried out in order to set up charging stations for electric vehicles.
- .2 Without being limiting, the work mainly includes the following elements by discipline:
 - .1 In electricity, provide and install all the necessary infrastructure and connect the electric recharging terminals provided by the Owner, as described in the plans and specifications;
 - .2 In civil engineering, provide and install all the necessary infrastructure and install the electric charging stations provided by the Owner, as described in the plans and specifications.
- .3 The work indicated in the plans and specifications includes the labor, materials, tools, equipment and temporary installations necessary for the full performance of the Contract.

1.4 SUBMITTAL PROCEDURES

- .1 Submit the required documents and samples in accordance with section 01 33 00 - Submittal Procedures
- .2 Submit Project construction progress schedule in accordance with Section [01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Submit the calendars listed below:
 - .1 Work schedule; including power cuts, fire extinguisher network, or others, which are to be coordinated with the Departmental Representative;
 - .2 Schedule for submitting shop drawings and technical data sheets;
 - .3 Sample submission schedule;
 - .4 Equipment delivery schedule;
 - .5 Start-up schedule;
 - .6 Training for building commissioning schedule;
- .4 Submit site-specific and Work Plan Health and Safety Plan accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 SITE MEETING (IN ACCORDANCE WITH SECTION 01 31 19 - PROJECT MEETINGS)

- .1 As soon as the contract is signed, the Contractor must check with the Departmental Representative and the Consultant appointed for the supervision of the works the date on

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which he must begin his work so that the Departmental Representative convenes the start-up meeting, in accordance with Section 01 31 19 - Project Meetings.

- .2 At this meeting, the Contractor must submit, for approval, a schedule for completion of the work.

1.6 WORK SEQUENCE

- .1 Construct Work in constant stages and without interruption to accommodate Owner's continued use of premises during construction.
- .2 Prepare and submit to the Departmental Representative the work progress schedule so as to reduce the impact on the occupants' operations.
- .3 Maintain access for firefighting purposes; also provide the means of firefighting.
- .4 Provide the necessary means to ensure the safety of occupants and the public.

1.7 CONTRACTOR USE OF PREMISES

- .1 The delimitation of the work area is proposed by the Contractor and approved by the Departmental Representative.
- .2 Use of the work area must take into account the restrictions below:
 - .1 Access to the main building is restricted and secure;
 - .2 The contractor and his subcontractors must have a valid reliability status throughout the duration of the work in order to have access to the building;
 - .3 The building will be accessible during normal occupancy hours, between 7:00 a.m. and 6:00 p.m., Monday to Friday.
- .3 In connection with these restrictions, if necessary, the Contractor must notify the Departmental Representative at least 72 hours in advance and coordinate the performance of the work with the latter.

1.8 CONSTRAINTS RELATED TO THE USE OF THE PREMISES BY THE CONTRACTOR

- .1 The building must be maintained in service and remain operational at all times.
- .2 Carry out work that generates noises, odors and vibrations (e.g. slab breakthroughs) outside of normal occupancy hours or according to the schedule established by the Departmental Representative, and to suspend them at the request of the Departmental Representative, on optionally.
- .3 Protect or dismantle and store the components of the existing structure that must be preserved in order to avoid damaging them.

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- .4 Once the work is completed, the existing work must be returned to a condition equivalent to or better than the condition it presented before the start of the work, including landscaping.
- .5 If required, the Contractor is responsible for moving and / or providing the necessary protection for the existing furniture and / or equipment when these interfere with the performance of the work.
- .6 Maintain free and unobstructed all service areas and traffic areas on the site.
- .7 The Contractor must keep the work area and the site free of debris.
- .8 The Contractor must circulate through the accesses identified in the plans and specifications or those identified by the Departmental Representative, including waste disposal.
- .9 The Contractor is responsible for ensuring the perfect water tightness of the structures and / or the building at all times.
- .10 If the Contractor judges that the area designated for storage and site facilities does not have sufficient surface area, he shall find the additional work or storage areas required to perform the work under this contract and pay the cost.
- .11 Refer to Section 01 52 00 - Site Installations for Temporary Installations, Service Roads and Parking Areas, Traffic Control and Utilities.

1.9 COMMUNICATION

- .1 The Contractor is not authorized to disclose information relating to the project to the occupants of the site.
- .2 The use of cell phones is permitted on site. The superintendent must be equipped with a smart phone in order to be able to receive site correspondence simultaneously from other stakeholders.
- .3 The Contractor must provide at its own expense the temporary telecommunications installations necessary for the performance of the work.
- .4 The contractor must, before the start of any work and before closing the partitions, ceilings and floors, take photos of the existing one and send them to the Departmental Representative and to the Consultant in the form of a photographic survey in reference. in section 01 33 00 – Submittal Procedures.
- .5 Only the Departmental Representative and Consultants, if applicable, have the authority to provide instructions to the Contractor.

1.10 OCCUPATION OF PREMISES BY OCCUPANTS

- .1 The occupants will occupy the premises for the duration of the work and will continue their normal activities during this period.
- .2 Collaborate with the Departmental Representative in establishing the work schedule, so as to reduce the impact of the work on the daily operations of the occupants.
- .3 The Contractor must notify the Departmental Representative at least 72 hours before the start of the work in a place where the occupants are present during the work.

1.11 OWNER FURNISHED ITEMS

- .1 The four (4) charging stations, the two (2) pedestals and the (1) communication gateway are provided by the ministry.

1.12 OWNER RESPONSIBILITIES:

- .1 Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
- .2 Deliver supplier's bill of materials to Contractor.
- .3 Arrange and pay for delivery to site in accordance with Progress Schedule.
- .4 Inspect deliveries jointly with Contractor.
- .5 Submit claims for transportation damage.
- .6 Arrange for replacement of damaged, defective or missing items.
- .7 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.

1.13 CONTRACTOR RESPONSIBILITIES:

- .1 Designate submittals and delivery date for each product in progress schedule.
- .2 Review shop drawings, product data, samples, and other submittals. Submit to Consultant notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
- .3 Receive and unload products on Site.
- .4 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
- .5 Handle products on Site, including uncrating and storage.

- .6 Protect products from damage, and from exposure to elements.
- .7 Assemble, install, connect, adjust, and finish products.
- .8 Provide installation inspections required by public authorities.
- .9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

1.14 EXISTING SERVICES

- .1 The Contractor must present to the Consultant and the Departmental Representative and have the latter approved, a schedule indicating the cut-offs of existing utility services (intrusion alarms and others, surveillance equipment, petroleum product tank , access control systems, electrical system, etc.) planned.
- .2 The Contractor must notify the Departmental Representative 72 hours in advance and obtain his authorization for any outage of utility services to be carried out inside or outside normal business hours.
- .3 When it comes to making connections to existing networks, perform them at the set times while interfering as little as possible with the progress of the work, the daily operations of users, occupants and pedestrian and vehicle traffic, if necessary.
- .4 After the work, the Contractor must ensure that all existing utility services are functional as originally.
- .5 Before the start of the work, define the extent and location of the underground utility pipes located in the work area and inform the Consultant.
- .6 Validate the location of utility conduits inside the building that are in the work area and inform the Consultant.
- .7 Provide temporary utility services as directed by the Department to maintain critical building and tenant systems.
- .8 Protect, move or keep in service utility pipes that are functional. If non-functional pipes are discovered during the work, seal them in a manner authorized by the competent authorities.

1.15 LEAVE

- .1 The Contractor must obtain the approval of the Departmental Representative to perform work on federal public service calendar holidays or on weekends. Where applicable, the Contractor may not under any circumstances claim additional time from the Departmental Representative.

1.16 DOCUMENTS REQUIRED ON THE SITE

- .1 Keep a copy of each of the following documents on site:
 - .1 Contract drawings;
 - .2 Specifications;
 - .3 Addenda;
 - .4 Approved Shop Drawings;
 - .5 Current shop drawing register;
 - .6 Change orders;
 - .7 Other contract changes;
 - .8 Field test reports;
 - .9 Copy of approved schedule;
 - .10 Departmental site emergency response plan;
 - .11 Health and safety plan and other safety related documents;
 - .12 Material safety data sheets (msds);
 - .13 Contractor annotated drawings for tqc plans;
 - .14 Communication plan;
 - .15 Environmental protection plan;
 - .16 Certificate of inspection;
 - .17 Manufacturer's certificate;
 - .1 Other documents as specified.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this specifications.

1.2 ACCESS TO THE WORKS AREA

- .1 The Contractor must coordinate with the Departmental Representative the schedule for accessing the site and carrying out the work.
- .2 During the kick-off meeting, the Contractor must provide the Departmental Representative with a list of his staff and subcontractors who will have access to the work area.
- .3 The Contractor and his staff, as well as his subcontractors, must comply with the regulations relating to the site, where the work is carried out at all times.
- .4 The Contractor is responsible for designing and constructing all temporary means of access to the site in accordance with applicable regulations.
- .5 The Contractor must circulate through the accesses identified in the plans and specifications and approved by the Departmental Representative, including for waste disposal.

1.3 WORK EXECUTION

- .1 Reduce the number of openings in the non-load-bearing and load-bearing elements of the structure for penetrations of mechanical and electrical installations or any other installation.
- .2 In the case of connection to the existing structure or to an adjacent structure, or for harmonization purposes, finish the surfaces in such a way as to ensure uniformity with the adjacent coverings. In the case of continuous surfaces, finish up to the closest intersection between two elements; in the case of an assembly of elements, redo the complete finish.

1.4 SMOKE-FREE ENVIRONMENT

- .1 The Contractor and his staff as well as his subcontractors must follow the instructions regarding the prohibition of smoking on the site, if applicable.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

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3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this specifications.

1.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Representatives of the Contractor, subcontractors and suppliers who attend project meetings are empowered and authorized to intervene on behalf of the parties they represent.
- .3 The Consultant must:
 - .1 Write the meeting agenda and send it to the participants and the parties concerned, at least one (1) day before the meeting is held.
 - .2 Chair project meetings.
 - .3 Write minutes of meetings. Indicate all important questions and decisions. Specify the actions taken by the different parties.
 - .4 Distribute meeting minutes to participants, concerned parties absent from meetings, within five (5) days of meeting.

1.3 PRECONSTRUCTION MEETING

- .1 Within 14 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 The Contractor must present at this meeting:
 - .1 Work schedule.
 - .2 Work Area Plan.
 - .3 List of subcontractors.
 - .4 EUPM;
- .3 The Contractor shall be present at this meeting.

1.4 PROGRESS MEETINGS

- .1 The Consultant and the Departmental Representative will establish, with the collaboration of the Contractor, a schedule of meetings to be held every two (2) weeks during the course of the work. This frequency is subject to modifications during the work by the Departmental Representative and the Consultant.
- .2 The Contractor must be present at this meeting.

- .3 The Contractor is responsible for informing his subcontractors of the meeting schedule and ensuring that they are present at meetings, when required.
- .4 The Contractor is responsible for notifying in writing the Departmental Representative and the Consultant of the problems encountered on the site before the holding of the meetings on the progress of the work. Indicate the activities that are late and their justifications. Suggest measures to make up for delays.
- .5 The Contractor is responsible for modifying the work execution schedule according to requests for modifications from the Departmental Representative and the Consultant.
- .6 The Contractor is responsible for transmitting electronically, before each meeting, on the progress of the work, the update of the execution schedule to the Departmental Representative and to the Consultant.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this specifications.

1.2 DEFINITIONS

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

1.3 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

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1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit to the Departmental Representative and the Consultant, no later than 14 working days after contract award, a bar chart (GANTT chart) which serves as an overall plan and is used for planning and monitoring of works. The bar chart should be done using MS Project. The Contractor must provide a PDF version as well as a .mpp version to the Departmental Representative and the Consultant with each mailing or update, with reference to section 01 31 19 - Project Meetings.
- .2 Submit Project Schedule to Departmental Representative and Consultant within 21 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 The infrastructure works must be completed no later than 40 working days after the date of contract award.
 - .2 The finishing work, as well as the electrical installations, must be completed no later than 60 working days after the date of contract award.
 - .3 The Certificate of Substantial Completion must be issued no later than 65 working days after contract award date.
 - .4 The Certificate of Final Completion must be issued no later than 75 working days after contract award date.

1.6 MASTER PLAN

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

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Kick-off meeting
 - .3 Shop Drawings, Samples.
 - .4 Permits.
 - .5 Mobilization.
 - .6 Excavation.

- .7 Backfill.
- .8 Electrical.
- .9 Testing and Commissioning.
- .10 Supplied equipment long delivery items.
- .11 Delivery dates requested in the case of materials supplied by the Department.
- .12 Substantial completion of the work.
- .13 Final completion of the works.

1.8 PROJECT MEETINGS

- .1 Refer to Section 01 31 19 - Project Meetings.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 REFERENCE STANDARDS

- .1 Not Used.

1.3 ADMINISTRATIVE

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

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 5 days for Departmental Representative's and Consultant's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative and Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative and Consultant prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative and Consultant may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative and Consultant in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.

- .5 Performance characteristics.
- .6 Standards.
- .7 Operating weight.
- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .9 After Departmental Representative's and Consultant's review, distribute copies.
- .10 Submit on (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative and Consultant may reasonably request.
- .11 Submit on (1) electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative and Consultant.
- .12 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

1.5 SAMPLES

- .1 Not Used.

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit, with the work progress report, and as directed by the Departmental Representative, one (1) PDF copy of the photographic documentation in color, high resolution, in JPG format, transmitted in a secure manner.
- .2 The photographic documentation must show the following:
 - .1 Name and number of the project;
 - .2 Date the photo was taken;
 - .3 The location of the photo taken;
 - .4 The traceability number of the product installed.
- .3 Frequency of photographic documentation: as directed by the Departmental Representative or once the work is completed but before the works are concealed and as directed by the Departmental Representative. In the event that the Consultant is unable to assess the compliance of the work, the Contractor must, at its expense, demonstrate it.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Quebec :
 - .1 Canadian Occupational Health and Safety Regulations (SOR / 86-304).
 - .2 Toolkit for all sectors of activity for health and safety management in the context of COVID-19.
 - .3 Flexibilities for Employers and Workers in the Context of COVID-19.
 - .4 COVID 19 GUIDE - Construction sites.
 - .5 Details of the control measures - COVID-19 (Distancing, physical barrier and wearing of a mask and eye protection).
 - .6 Safety code for the construction industry, R.S.Q., c. S-2.1, r.4.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Send the site-specific health and safety plan to the Departmental Representative for comments by the Departmental Representative, as indicated in section 01 11 00 - Summary of the work, at least 10 days before the start of the work.
- .2 The Departmental Representative examines the health and safety plan prepared by the Contractor for the site and submits his observations to him within 5 working days of receipt of this document. If necessary, the Contractor revises his health and safety plan and submits it again to the Departmental Representative no later than 5 days after receipt of the Departmental Representative's observations.
- .3 The Departmental Representative reserves the right not to authorize the start of work on the site until the content of the health and safety plan is satisfactory.
- .4 If the scope of the work changes and if the Contractor's working methods differ from his initial forecasts or for any other new applicable condition, the Contractor has an obligation to update his health and safety plan.
- .5 The review by the Departmental Representative of the health and safety plan prepared by the Contractor for the site in no way limits the latter's overall responsibility for health and safety during construction work.
- .6 Submit to Departmental Representative, within 24 hours, a copy of any inspection report, correction notice or recommendation issued by federal, provincial and territorial government health and safety inspectors.
- .7 Submit to the Departmental Representative, within 24 hours, an investigation report for any accident resulting in injury and for any incident that highlights a potential risk.

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- .8 The investigation report must contain at least the following elements:
 - .1 Date, time and place of the accident;
 - .2 Name of the subcontractor involved in the accident;
 - .3 Number of people involved and condition of injured;
 - .4 Identification of witnesses;
 - .5 Detailed description of the tasks performed at the time of the accident;
 - .6 Equipment used to accomplish the tasks performed at the time of the accident;
 - .7 Corrective measures taken immediately after the accident;
 - .8 Causes of the accident;
 - .9 Preventive measures put in place to avoid a similar accident.
- .9 Submit WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 43 – Environmental Procedures. The Contractor must also keep a copy of these sheets on the site.
- .10 Submit to Departmental Representative the On-site Contingency and Emergency Response Plan.

1.4 FILING OF NOTICE

- .1 Before starting work, send the site opening notice to the CNESST. Send the Departmental Representative a copy of the notice of opening and the acknowledgment of receipt sent by the CNESST.
- .2 At the end of all the work, the closure notice must be sent to the CNESST, with a copy to the Departmental Representative.
- .3 The Contractor must assume the role of the project manager at all times, unless otherwise indicated, within the limits of the site and anywhere else where he must perform work within the framework of this project. The Contractor must recognize the responsibility of project management and identify himself in the notice of opening of the site that he sends to the CNESST.
- .4 The Contractor must agree to divide and identify the site adequately at all times during the duration of the project.

1.5 MEETINGS

- .1 Organize a health and safety meeting with the Departmental Representative before the start of the work, and ensure its direction. If applicable, combine this meeting with the kick off meeting.

1.6 REGULATORY REQUIREMENTS

- .1 Comply with all laws, regulations and standards that are applicable to the performance of the work.
- .2 Observe the standards and regulations prescribed to ensure normal progress of work on sites contaminated by dangerous or toxic materials.

- .3 Always use the most recent version of the standards cited in the Safety Code for the construction industry (S-2.1, r.4), notwithstanding the date indicated in this Code.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:

1.8 GENERAL REQUIREMENTS

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

1.9 RESPONSIBILITY

- .1 The Contractor must accept and assume all the tasks and obligations normally devolved on the project manager under the Act respecting occupational health and safety (LRQ, chapter S-2.1) and the Safety Code for construction work. construction (S-2.1, r.4).
- .2 The Contractor must assume responsibility for the health and safety of persons present on the site, as well as the protection of property located on the site; also assume, in the areas adjacent to the worksite, the protection of people and the environment insofar as they are affected by the work.
- .3 Regardless of the size and location of the site, the Contractor must clearly delimit the site boundaries by physical means in accordance with section 01 52 00 - Site facilities.
- .4 Comply with, and enforce by employees, the safety requirements set out in contract documents, ordinances, applicable local, territorial, provincial and federal laws and regulations, as well as in the prepared health and safety plan for the site.

1.10 COMPLIANCE REQUIREMENTS

- .1 Write a site-specific health and safety plan, based on the prior risk / hazard assessment, before starting the work. Implement this plan and ensure that it is respected at all points until the demobilization of all site personnel. The health and safety plan must take into account the specifics of the project.
- .2 If applicable, the health and safety plan must include at least the following elements:
 - .1 Company policy on health and safety;
 - .2 Description of the stages of the work;
 - .3 Total cost of work, schedule and expected workforce curve;
 - .4 Organizational chart of health and safety responsibilities;
 - .5 Physical and material organization of the site;
 - .6 Identification of risks for each stage of the work, corresponding prevention measures and methods of implementation;

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- .7 Identification of preventive measures related to the specific risks inherent in the workplace indicated in the article RISKS INHERENT AT THE WORK SITE;
- .8 Identification of preventive measures for the health and safety of employees and / or the public of the work site as indicated in the article SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS;
- .9 Training required;
- .10 Procedure in case of accident / injury;
- .11 Written commitment from all stakeholders to respect this plan;
- .12 Site inspection grid based on preventive measures;
- .13 Emergency response plan, which must contain at least the following elements:
 - .1 Site evacuation procedure;
 - .2 Identification of resources (police, firefighters, ambulances, etc.);
 - .3 Identification of the responsible persons on the site;
 - .4 Identification of first aiders;
 - .5 Communication organization chart (including site manager and departmental representative);
 - .6 Training required for those responsible for its application;
 - .7 Any other necessary information, taking into account the characteristics of the site.
- .3 The Departmental Representative gives the Contractor the site evacuation procedure, if applicable; the latter must then align the site procedure with that of the site and forward it to the Departmental Representative.
- .4 In addition to the health and safety plan, during the work the Contractor must prepare and send to the Departmental Representative a written request (see Form for written request for work with high accident risk in appendix) specific for everything work presenting a high risk of accidents or at the request of the Departmental Representative, such as:
 - .1 Demolition work;
 - .2 Lifting work;
 - .3 Work in confined spaces;
 - .4 Cutting and patching work.
- .5 The Contractor must plan and organize the work in such a way as to promote the elimination at the source of the dangers.
- .6 Equipment, tools or means of protection which cannot be installed or used without compromising the health and safety of workers or the public is deemed to be inadequate for the work to be performed.

- .7 All mechanical equipment (examples: lifting devices for people or materials, mechanical shovels, concrete pumps, concrete saws, but not limited to) must be inspected before delivery to the job site. The Contractor must obtain an inspection certificate signed by a mechanic and dated less than a week before the arrival of each equipment on the site, and keep it on the site; he must give it to the Departmental Representative on request.
- .8 Ensure that all inspections (daily, periodic, annual, etc.) of equipment for lifting people or materials required by the standards in force are carried out. Submit a copy of the inspection certificates upon request to the Departmental Representative.
- .9 The Departmental Representative and the Site Supervisor may at any time, if they suspect a defect or risk of accident, order the immediate shutdown of any equipment and require an inspection by a specialist of his choice.
- .10 The Departmental Representative must be consulted for the location of gas cylinders and tanks on the site.

1.11 UNFORSEEN HAZARDS

- .1 When a source of danger not specified in the contractual documents and not identifiable during the preliminary inspection of the site appears by the fact or during the execution of the work, the Contractor must immediately stop the work, notify the person responsible for the health and safety on the site, put in place temporary protective measures for workers and occupants and notify the Departmental Representative verbally and in writing. The Contractor must then make the necessary changes to the health and safety plan and put in place the necessary safety measures so that work can resume.

1.13 POSTING OF DOCUMENTS

- .1 Ensure that relevant documents, articles, ordinances and notices are posted, in a conspicuous place, on the job site, in accordance with the laws and regulations of the province and in consultation with the Departmental Representative.
- .2 As a minimum, the following information and documents must be posted in a location easily accessible to workers:
 - .1 Notice of site opening;
 - .2 Identification of the main contractor;
 - .3 Company policy on SST;
 - .4 A site specific health and safety plan;
 - .5 Emergency measures plan;
 - .6 Minutes of worksite committee meetings;
 - .7 Names of representatives on the site committee;
 - .8 Name of first aiders;
 - .9 Intervention and correction reports issued by the CNESST.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Inspect the workplaces, complete the site inspection grid attached as an appendix and submit it to the Departmental Representative.
- .2 Immediately take the necessary measures to correct the situations deemed non-compliant observed during the inspections mentioned in the previous paragraph or noted by the Site Supervisor and / or the Departmental Representative.
- .3 Submit to the Departmental Representative a written report of the measures taken to correct the situation in the event of non-compliance in terms of health and safety.
- .4 The Contractor must grant the person mandated to ensure health and safety all the authority necessary to order the stopping and resumption of work when he considers it necessary or desirable for health reasons and security. He must ensure that the health and safety of occupants and site personnel as well as environmental protection always take precedence over issues related to the cost and schedule of the work.
- .5 The Departmental Representative and / or the Site Supervisor may order the work to be stopped if the Contractor does not take the necessary corrective measures regarding the conditions deemed non-compliant in terms of health and safety. Without limiting the scope of the preceding articles, he may also order the work to be stopped at any time if, according to his perception, there is a danger or risk to the health or safety of site personnel or the public or to the public environment.

1.15 PREVENTION OF VIOLENCE

- .1 Health and safety management on construction sites includes the implementation of measures to protect the psychological health of all persons who access the site where the work is taking place. Thus, in addition to physical violence, verbal abuse, non-inclusive behavior, bullying and harassment are not tolerated on the site. Anyone who demonstrates such gestures or behavior receives a warning and / or may be permanently expelled from the site.

1.16 BLASTING

- .1 Blasting or other use of explosives is not permitted [without prior receipt of written instruction by [Departmental Representative] [DCC Representative] [Consultant]].
- .2 Do blasting operations in accordance with Section [31 23 16.26 - Rock Removal].

1.17 POWDER ACTUATED DEVICES

- .1 Use cartridge devices only with written permission from the Health and Safety Officer.
- .2 Anyone who uses a nail gun must hold a training certificate and meet all the requirements of section 7 of the Safety Code for the construction industry (S-2.1, r. 4).
- .3 Any other cartridge device must be used according to the manufacturer's instructions and according to the applicable standards and regulations.

1.18 USE OF PUBLIC ROADWAYS AND PROTECTION OF NEIGHBOURING PROPERTIES

- .1 When it is necessary to encroach on the public highway for operational reasons or to ensure the safety of workers, occupants or the public (e.g. use of scaffolding, cranes, excavation work, etc.), the Contractor must obtain at its own expense all authorizations and permits required by federal, provincial and / or municipal regulations.
- .2 The Contractor must install at his own expense all signage, fences and / or palisades and other devices required by regulations to ensure the safety of the public, neighboring properties and his own installations.
- .3 If necessary, assume full responsibility for damage caused.

1.19 LOCKOUT

- .1 For any work on equipment powered by electricity or any other energy source, the Contractor must send a general lockout procedure to the Health and Safety Manager and / or the Consultant.
- .2 All workers involved in work requiring lockout must have completed lockout training given by a recognized organization.
- .3 Before undertaking the lockout of equipment in an occupied site, the Contractor must coordinate his work with the Departmental Representative if the shutdown of energy sources may have an impact on site operations or on occupants. .

- .4 The Contractor must identify a qualified person as being responsible for the lockout and must ensure that this person writes the lockout sheet attached in the appendix for each equipment that must be padlocked. The lockout sheet must be sent to the Health and Safety Manager and / or the Consultant at least 48 hours before the start of the work. The lockout sheet must include at least the following information:
- .1 Description of the work to be performed;
 - .2 Identification, description and location of the circuit and / or equipment to be padlocked;
 - .3 Identification of energy sources that power the equipment;
 - .4 Identification of each of the cut-off points;
 - .5 Sequence of lockout and release of residual energy as well as sequence of unlocking;
 - .6 List of necessary padlocking equipment;
 - .7 Method of verifying zero energy;
 - .8 Name and signature of the person who wrote the sheet.
- .5 At the time of padlocking, the responsible person must date the sheet and ensure that each worker involved in work on the circuit / padlocked equipment affixes his name on the sheet and sign it.

1.20 ELECTRICAL WORK

- .1 The Contractor shall ensure that all work of an electrical nature is performed by qualified employees in accordance with provincial regulations on qualification and vocational training.
- .2 The Contractor must comply with the requirements of CSA Z462 Electrical safety at work.
- .3 All work on electrical equipment must be done with the power off, unless it is not possible to completely disconnect this equipment.
- .4 The Contractor must comply with all the requirements of the "Lockout" paragraph of this section.
- .5 The Contractor must notify the Consultant in writing of any work that cannot be done with the power off and obtain authorization. He must demonstrate to the Consultant that it is impossible to do work with the power off and provide all the information necessary to complete and obtain the work permit under power attached in the appendix (work method, evaluation of the arc level electrical, perimeter of protection, protective equipment, etc.) before the start of work, except for the exceptional cases provided for in standard CSA Z462 Electrical safety at work.

1.21 EXPOSURE TO ASBESTOS

- .1 The work covered by this specification is not expected to involve the handling of materials containing asbestos; however, if the Contractor or if the Departmental Representative or his agent discover materials that are likely to contain asbestos, the Contractor must immediately stop the work and notify the Departmental Representative. If it is subsequently demonstrated that these materials contain asbestos, the Contractor must comply with the following requirements.
- .2 Before the start of any work likely to emit asbestos dust, the Contractor must:
 - .1 Provide a written work procedure identifying the risk level of the work (low, moderate, high), as defined in section 3.23 of the Safety Code for the construction industry S-2.1, r-4, and which account of all the requirements of this same section.
 - .2 Hold certificates showing that all workers involved in the work have received training on the risks related to asbestos and on the procedure required in the previous paragraph.
 - .3 Install screens or partitions to prevent dust migration out of the work area and thus protect other workers and occupants.
 - .4 Wear respiratory and eye protection equipment as well as any protective suit during all work operations in the presence of asbestos.
 - .5 Demonstrate that he has on hand all the material and equipment necessary for the respect of the procedure and the safe execution of the work.

1.22 RESPIRATORY PROTECTION

- .1 The Contractor must ensure that all workers who must wear a respiratory protection device as part of their tasks have received training for this purpose as well as the adjustment tests of their breathing apparatus, in accordance with the CSA standard. Z94.4 Selection, maintenance and use of respirators. The fit test certificates must be submitted to the Departmental Representative on request.

1.23 PREVENTION OF FALL RISKS

- .1 Plan and organize the work in such a way as to promote the elimination at the source of the dangers of falls. When personal fall protection is required, workers must use a safety harness in accordance with CAN - CSA- Z-259.10 - M90. The seat belt should not be used for fall protection.
- .2 All persons using a lifting platform (scissors, telescopic mast, articulated mast, rotating mast, etc.) must have received training for this purpose.
- .3 Wearing a safety harness is mandatory in all lifting platforms with telescopic, articulated or rotating mast.
- .4 Delimit a danger zone around each lifting platform.
- .5 Any opening in a floor or in a roof must be surrounded by a guardrail or covered with a cover fixed to the floor and resistant to the loads to which it may be subjected, regardless of the dimensions of this opening and the height of fall it represents.

- .6 Anyone who works within two meters of a place presenting a risk of falling of three meters or more must use a safety harness in accordance with the requirements of the regulations, unless there is the presence of a guard. -body or other element offering equivalent security.
- .7 Despite regulatory requirements, the Departmental Representative may require the installation of guardrails or the use of safety harnesses for certain specific situations presenting a risk of falls of less than 3 m.

1.24 EXCAVATION WORK

- .1 In addition to the requirements of the Safety Code for the construction industry, S-2.1, r.4, the contractor who carries out trenching or excavation work must comply with the following requirements:
 - .1 Complete the attached form before the start of the excavation work and send it to the Site Supervisor, and keep it in the project file;
 - .2 Send the following documents to the Departmental Representative, as the case may be:
 - .1 Plans and specifications, signed and sealed by an engineer, of the shoring to be put in place for the digging work; or
 - .2 Opinion of the Engineering Consultant specifying the angle of the walls of the trench or excavation.
 - .3

1.25 LIFTING LOADS WITH A CRANE OR A CRANE TRUCK

- .1 Unless otherwise specified, the Contractor must prepare a lifting plan and send it to the Site Supervisor for any lifting operation carried out using a crane or crane truck, at least 5 days before the start of the lifting operations covered by this plan. This lifting plan must contain at least the information indicated at the end of this section.
- .2 The lifting plan must be signed and sealed by the engineering consultant for the following lifting operations:
 - .1 Lifting of concrete panels;
 - .2 Lifting of mechanical / electrical equipment on a roof or on floors of a building;
 - .3 Lifting loads that encroach on a public thoroughfare;
 - .4 Lifting of large or heavy loads;
 - .5 Any other lifting operation, according to the requirements of the contract documents.
- .3 In addition to the above requirements, the Contractor must plan lifting operations to prevent loads from passing over occupied areas on a site. When it is impossible to do otherwise, the lifting plan must be signed and sealed by the Engineering Consultant and must guarantee the safety of the occupants of this area. This plan must be approved by the Site Supervisor. The Departmental Representative may, if he deems it necessary, order evening and weekend work.

- .4 As soon as work begins on the site, the Contractor must send the Site Supervisor the list of the lifting plans planned for the entire duration of the site. This list should be updated as needed if changes are made during the work.
- .5 In addition to the mechanical inspection certificate, all cranes or truck cranes must have on board the cabin the annual inspection certificate and the crane logbook.
- .6 The entire lifting area must be delimited so as to prevent any unauthorized person from accessing it.
- .7 The Contractor must carefully inspect all slings and lifting accessories in use to ensure that those in poor condition are destroyed and discarded.
- .8 The lifting of compressed gas cylinders must be carried out using a basket specially designed for this purpose.

1.26 MINIMUM CONTENT OF A LIFTING PLAN

- .1 Sketch showing at least the location of the crane, the surrounding installations, the area covered by lifting operations, the pedestrian and vehicle traffic lanes, the safety perimeter, etc.
- .2 Weight and dimensions of loads.
- .3 List of lifting accessories and weights of each.
- .4 Total load lifted.
- .5 Maximum height of obstacles to be overcome, if applicable.
- .6 Lifting height of loads in relation to the roof surface (in the case of lifting loads to be placed on roofs).
- .7 Use of guide cables or not required.
- .8 Type and capacity of crane used.
- .9 Boom length and angle.
- .10 Radius of action of the crane.
- .11 Deployment of stabilizers.
- .12 Percentage of crane capacity utilization.
- .13 Confirmation of verification of lifting equipment.
- .14 Identification of the crane operator and the person in charge of lifting operations with signatures and date.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not used.

Part 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental protection: environmental protection: prevention and control of pollution, and prevention of disturbance of the habitat and the environment during construction work. The prevention of pollution and environmental damage covers the protection of soil, water, air, biological and cultural resources; it also includes the management of visual aesthetics, noise, solid, chemical, gaseous and liquid wastes, radiant energy, radioactive materials and other pollutants.

1.3 REFERENCE STANDARDS

- .1 Not Used.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 – Health and Security.

1.5 ENVIRONMENTAL PROTECTION PLAN

- .1 Not Used.

1.6 ENVIRONMENTAL EMERGENCY PLAN (EEP)

- .1 The Contractor must provide a EEP, with the following objectives:
 - .1 Frame the response to an environmental emergency, such as a spill, so that it is dealt with as quickly and efficiently as possible.
 - .2 Reduce risks and limit environmental impacts in the event of an environmental emergency.
 - .3 Identify the people and authorities responsible, as well as the procedure to be followed in an environmental emergency.

- .4 Identify sensitive areas on the site and risky activities, in addition to defining the necessary tools (response equipment, training, exercises, communications, etc.).
- .2 He must transmit the EEP to all stakeholders, and keep at least one copy accessible and visible on the site.
- .3 The Contractor is responsible for presenting the EEP to all stakeholders working on the site to ensure that it is understood by all.
- .4 The EEP must include reports to be produced in the event of an unforeseen spill of a controlled substance.
- .5 The EEP must include the following coordinates:
 - .1 Canadian Coast Guard (CCG) Alert and Warning Network: 1-800-363-4735;
 - .2 ECCC National Environmental Emergency Center: 1-866-283-2333;
 - .3 Emergency-Environment response team from the Ministry of the Environment and the Fight against Climate Change (MELCC): 1-866-694-5454.

1.7 FIRES

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

1.8 WASTE DISPOSAL

- .1 Refer to section 01 74 00 - Cleaning.
- .2 Burial of waste and scrap materials on the work site is prohibited.
- .3 Dumping of wastes or volatile materials such as mineral spirits, oil or paint thinner into waterways, storm sewers or sanitary sewers is prohibited.

1.9 DRAINAGE

- .1 Not Used.

1.10 SITE CLEARING AND PLANT PROTECTION

- .1 Not Used.

1.11 POLLUTION CONTROL

- .1 Maintain temporary installations intended to prevent erosion and pollution, and put in place under this contract.
- .2 Materials imported to the site for the work must be free from contamination.
- .3 Limit emissions from materials, parts of equipment and tools in accordance with local authority requirements. Check with local authorities for environmental compliance requirements, if applicable.
- .4 Water dry materials and cover waste to prevent wind blowing dust or dragging debris. Remove dust from temporary roads.

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- .5 Soils excavated on the parking lot must be placed in piles and managed separately from those excavated on the grassy field. It is forbidden to backfill with soil from parking on the grassy area and vice versa.
- .6 In the event that signs of contamination (e.g. odor, stain, debris, presence of paint chips, etc.) are observed, the soils must be placed in a separate pile from the soils considered clean, sampled, analyzed and managed according to their level of contamination.
- .7 Contaminated or potentially contaminated soils (pending analysis results) are placed in piles temporarily, a waterproof membrane must be installed under each pile so as not to contaminate the underlying soils. Additionally, if the piles are left in place for more than a day or the weather conditions are conducive to the spread of pile soils in the environment, such as strong winds or rain, then the piles will need to be covered. of a canvas. In the event of rain, adequate measures should be put in place to minimize runoff through the piles of contaminated soil.
- .8 During off-site contaminated soil management work, the contractor must be in constant communication with the Departmental Representative to ensure that the contaminated soil disposal sites selected by the contractor are authorized by the MELCC. Contaminated soil weighing tickets at landfills or treatment centers authorized by the MELCC must be collected by the Departmental Representative and recorded.
- .9 In the event that contaminated soil or materials are found during the excavation, manage them according to the specific mitigation measures in the environmental protection plan.

1.12 ACCIDENTAL RELEASE OF PETROLEUM PRODUCTS

- .1 Always have an emergency oil product recovery kit including, but not limited to:
 - .1 Appropriate absorbent products, including sphagnum moss, granular absorbents, containment socks, absorbent rolls, pads or cushions;
 - .2 Recovery containers;
 - .3 Recovery bags;
 - .4 Related accessories, including gloves, safety glasses, masks, shovel, tags;
 - .5 Any other essential element to deal with small-scale accidental spills and ensure the recovery and storage of contaminated material and the management of contaminated soil and material;
 - .6 Copies of the oil spill incident report.
- .2 If other hazardous materials in liquid form, within the meaning of the Regulation respecting hazardous materials (RLRQ, chapter Q-2, r. 32), are used on the site, provide the appropriate equipment, in particular specialized absorbents and neutralizers, to efficiently recover these materials.
- .3 Always have additional kits available for all work carried out on the edge of a lake, watercourse or wetland so that they are easily accessible at all times for rapid intervention. Provide a kit at each work site if it decides to work simultaneously at more than one location.

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- .4 In the event of an oil spill or any other harmful substance, all means necessary to stop the leak and contain the spilled product must be taken. The contractor will then have to recover the product and restore the premises.
- .5 Provide for the establishment and application of the environmental emergency response plan in the event of an accidental spill of contaminants.

1.13 NOTICE OF NON-COMPLIANCE

- .1 A written notice of non-compliance will be issued to the Contractor by the Departmental Representative each time a non-compliance with a federal, provincial or municipal law, regulation or permit, or any other element of the management plan, is observed. environmental protection implemented by the Contractor.
- .2 After receiving a notice of non-compliance, the Contractor must propose corrective measures to the Departmental Representative, and he must implement them as soon as possible with the latter's approval.
- .3 The Contractor must wait to have obtained the written approval of the Departmental Representative before proceeding with the implementation of the proposed measures.
- .4 If required, the Departmental Representative will order the work to be stopped until satisfactory corrective measures are taken.

1.14 USE, STORAGE AND MAINTENANCE OF EQUIPMENT AND MACHINERY

- .1 The equipment used must be clean, soil-free and free from invasive alien species before being transported to the site.
- .2 At all times, ensure that equipment and machinery are in good working order and free from oil, grease and fuel leaks (including mufflers and other noise reduction systems). Regular inspections must be made (before and during the work). Any equipment that shows a leak must be evacuated from the site as soon as a flow is observed.
- .3 The maintenance and cleaning of equipment and machinery must be done at a distance of at least thirty (30) meters from a water or damp environment, either outside the site or in a designated place and adequately equipped for this purpose in the work area.
- .4 The refueling operations with fuel and lubricant must be carried out above a watertight retention basin at a distance of at least thirty (30) meters from a water or humid environment. Absorbent material should be placed in such a way as to catch any accidental spillage, however small. Contaminated absorbent material should be disposed of outside the site.
- .5 Comply with additional mitigation measures in the environmental protection plan

Part 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

Part 3 EXECUTION

3.1 CLEANING

.1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 DEFINITIONS

- .1 Application Specialist: An individual who performs surface preparation and application of protective coatings and linings to steel and concrete surfaces of complex industrial structures.

1.3 INSPECTION

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

1.4 PROCEDURES

- .1 Notify Departmental Representative and Consultant 5 days in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative and Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

1.6 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

- .2 The cost of tests and mix designs that have not been specifically required under contract documents or local site regulations are subject to the approval of the Consultant.

1.7 MILL TESTS

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

1.8 EQUIPMENT AND SYSTEMS

- .1 Refer to Section 01 91 13 – General Commissioning Requirements.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 CONTRACTOR'S LIABILITY

- .1 The Contractor is solely responsible for safety, fire protection, theft and vandalism on the site and temporary installations, he must take all necessary protection measures on the site and the work area.
- .2 In the event of a false fire alarm resulting from the work, the Contractor must assume the associated costs.
- .3 Avoid noise, odors and dust as much as possible so as not to inconvenience occupants and operations in the building and on the existing site. If necessary, install dust screens or protective partitions for work that generates dust.
- .4 Inspect the work area with the Departmental Representative before mobilizing the Contractor in order to examine the existing conditions and identify elements likely to be damaged or moved during the work. The contractor must draw up a list of the findings resulting from this inspection and send it to the Departmental Representative. By starting the work, the Contractor accepts the existing conditions.
- .5 The Contractor is responsible for any deterioration resulting from a lack of protection or inadequate protection. It must cover with plywood or protection the finished surfaces that must be protected to allow the work to be carried out.
- .6 In the event of a discrepancy in the plans and specifications during the discovery of elements by the Contractor, the latter must notify the Consultant in order to carry out an inspection and identify any condition likely to influence the execution of the works.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare and present to the Departmental Representative, during the start-up meeting, a site installation plan indicating the proposed location and the dimensions of the area to be fenced, the location of the site trailers and their electricity supply , the location of various site equipment, access routes to the work area and details of the installation of the fence.
- .2 Provide the necessary means of use of the temporary utilities to allow the work to be carried out according to the schedule.
- .3 Construct a fence surrounding the work area 1830mm high using steel mesh netting. Have the installation approved by the Departmental Representative.
- .4 Provide a secure access barrier for trucks and a pedestrian gate, as directed and respecting traffic restrictions on adjacent streets. Provide locks and keys for the barriers.
- .5 The fence must resist the pressures exerted by the wind and the snow.

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- .6 Keep clean, maintain and repair as needed the site fence. .
- .7 Install sturdy fences around trees and plants to be left in place to protect them against damage that could be caused to them by the material used or by certain construction practices.
- .8 Indicate areas to be coated with gravel to prevent mud deposits, if required.
- .9 Indicate any additional area or transit area.
- .10 Dismantle the equipment and remove it from the site once the work is completed.

1.4 WASTE CONTAINER

- .1 Containers should be emptied outside of normal business hours.
- .2 The level of waste in the container must not exceed its height.
- .3 The Contractor must assume the costs of transporting waste and disposal.
- .4 The Contractor shall surround the containers with a site fence, only if they are outside the work area.

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted in the Contractor's work area.
- .2 The Contractor must develop suitable access routes to the site and ensure its maintenance and snow removal. If required, the Contractor has the obligation to clean the traffic lanes and areas of operations if the debris found there results from the work carried out by the latter.

1.6 SITE OFFICE

- .1 No space located near the site is granted to the Contractor to allow him to set up his site office. Spaces must be taken temporarily on the site or in the storage space. These spaces must be moved and, if necessary, follow the work area as described in the schedule.
- .2 Set up a space inside the work area with an adjusted table for spreading out the drawings.
- .3 Provide a complete and identified first aid kit and store it in an easily accessible place.
- .4 Site meetings may be held in a room determined by the Departmental Representative, if applicable.
- .5 Keep the premises clean at all times.

1.7 STORAGE OF MATERIALS, EQUIPMENT AND TOOLS

- .1 Provide sheds or secure spaces, at the Contractor's expense, weatherproof, for the storage of materials, equipment and tools, and keep them clean and in good order.
- .2 No storage of materials, equipment or waste is tolerated in the streets around the site or on the building landing. The delivered materials must immediately be taken to the site.

1.8 ELECTRICAL ENERGY AND WATER SUPPLY

- .1 Connection points and quantitative limits are determined on site by the Consultant, from whom written authorization must be obtained before making any connection. Connection to the existing electricity supply network must be carried out in accordance with the prescriptions of the Canadian Electrical Code.
- .2 The use of temporary services by the Contractor is subject to the needs of the Departmental Representative and may be terminated at any time by notice. .3 Repair any damage caused to electrical power systems by their use during the execution of this contract.
- .3 The Contractor shall supply and install, at his own expense, all the material and temporary pipes necessary to bring these services from the connection points.

1.9 SANITARY FACILITIES

- .1 Provide temporary sanitary facilities for the personnel of the Contractor as well as his subcontractors.
- .2 Post required notices and take all precautions required by local health authorities. Keep the premises and the area clean.

1.10 CONSTRUCTION SIGNAGE

- .1 If applicable, send the Departmental Representative the approval requests for the installation of a Contractor's identification panel.
- .2 With the exception of warning signs, no other sign or other sign may be installed on the site.
- .3 The inscriptions appearing on the instruction panels and on the safety notices must be written in both official languages. Graphic symbols must conform to CAN / CSA-Z321.
- .4 Keep approved signs and notices in good condition for the duration of the work and remove them from the site upon completion, or before if requested by the Departmental Representative.

1.11 ACCESS ROAD TO THE WORK AREA

- .1 Notify the Departmental Representative at least one (1) week in advance if one or more normal access routes to the site must be moved.
- .2 The Contractor is responsible for damage caused by heavy vehicles transporting excavation, demolition and / or construction materials. The route taken by the vehicles must be approved by the Departmental Representative.
- .3 Access to the site must be made to ensure the safety of the public and workers, both from the point of view of municipal services, police, ambulance and firefighters.
- .4 Install all traffic signs and protection necessary to allow maximum safety for pedestrians and automobiles. .5 Where applicable, retain the services of competent flaggers and provide the signaling devices, barriers, lights and lighting necessary for the execution of the work and the protection of the public.

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1.12 CLEAN-UP

- .1 If required and at the request of the Departmental Representative, the Contractor must store the materials / equipment recovered during the demolition work at the location indicated by the Departmental Representative.
- .2 Before the provisional acceptance visit of the work, the Contractor is required to carry out a complete cleaning, at his expense, of the following:
 - .3 The area affected by the work in order to eliminate dust and residual debris;
 - .4 Ventilation ducts in the work area and near it by a mechanical process.
 - .5 The Contractor has the obligation to restore the premises to their initial state, in accordance with section 01 11 00 - Summary of the work.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 REFERENCE STANDARDS

- .1 In cases where there is any doubt as to the conformity of certain products or systems with the relevant standards, the Consultant reserves the right to verify it by tests with reference to section 01 91 13 - Commissioning - Requirements general.

1.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

1.4 AVAILABILITY

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

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Refer to sections 01 11 00 - Summary of the work and 01 52 00 - Site installations.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Place construction lumber, sheet, board and other materials on rigid, flat supports so that they do not rest directly on the ground. Give a low slope in order to favor the flow of condensation water.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative and Consultant.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's and Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.7 MANUFACTURER'S INSTRUCTIONS

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

1.8 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative and Consultant if required Work is such as to make it impractical to produce required results.

- .2 Do not employ anyone unskilled in their required duties. Departmental Representative and Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative and Consultant, whose decision is final.

1.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.10 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before hiding any elements, inform the Departmental Representative and the Consultant of any abnormal situation and send a photographic record with reference to section 01 33 00 - Documents and samples to be submitted. Install as directed by the Consultant.

1.11 REMEDIAL WORK

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

1.12 LOCATION OF FIXTURES

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

1.13 FASTENINGS

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

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- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

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

1.15 EXISTING UTILITIES

- .1 Refer to section 01 11 00 - Summary of the work.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 PROJECT CLEANLINESS

- .1 Keep the site clean and free from any accumulation of debris, materials and wastes other than those generated by the occupants and other suppliers of the Department.
- .2 Evacuate debris, materials and waste from the site daily, or if applicable, at times predetermined by the Departmental Representative. Debris, materials and waste should not be burned on the job site.
- .3 Make the necessary arrangements and obtain permits from the competent authorities for the disposal of debris, materials and wastes.
- .4 Plan and have the Departmental Representative approve the type of container used for the evacuation of debris, materials and waste.
- .5 Provide and use separate and identified containers for recycling.
- .6 Dispose of debris, materials and waste in designated areas off site.
- .7 Clean interior surfaces before beginning of finishing work and keep these areas free of dust and other impurities.
- .8 Safely store volatile wastes in closed metal containers and evacuate them off site at the end of each shift.
- .9 Use only cleaning products recommended by the manufacturer of the surface to be cleaned, and use them according to the recommendations of the manufacturer of the products in question.
- .10 Establish cleaning schedule so that dust, debris and other raised dirt does not fall on freshly painted wet surfaces and do not contaminate building systems.

1.3 FINAL CLEANING

- .1 Upon substantial completion of the work, remove surplus materials, tools, and construction equipment and material that are no longer required for the performance of the remainder of the work.
- .2 Remove debris, materials and wastes, except those generated by occupants and other Departmental suppliers, and leave premises clean and ready for occupancy.
- .3 Clean and polish glazing, mirrors, hardware, wall tiles, chrome or enamel surfaces, laminate surfaces, stainless steel or porcelain enamel elements as well as household, mechanical and electrical appliances. Replace any broken, scratched or damaged glass.

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- .4 Clean reflectors, diffusers and other surfaces in work area.
- .5 Wax, soap, seal or properly treat floor coverings according to manufacturer's instructions.
- .6 Examine finishes, accessories and material to ensure that they meet prescribed requirements for operation and quality of work.

1.4 RESTORATION OF THE PREMISES

- .1 The Contractor has the obligation to restore the premises to their initial state, in accordance with section 01 11 00 - Summary of the work.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative and Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative Consultant's inspection.
 - .2 Departmental Representative and Consultant's Inspection:
 - .1 Departmental Representative and Consultant and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 The work to be corrected and those remaining does not prevent the work from being ready for the use for which it is intended.
 - .3 Completion Tasks: submit written certificates in French that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Certificates required by competent authorities: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 The commissioning of mechanical devices, materials and systems has been carried out in accordance with the requirements of Section 01 91 13 - Commissioning - General Requirements, and a copy of the final commissioning report has been submitted. to the Consultant.
 - .4 Certificate of substantial completion:

- .1 When the contractor considers that the work has been completed and the Departmental Representative judges that the site is ready to be used for the purposes for which it is intended, the Contractor requests that an inspection be carried out with the Departmental Representative and the Consultant for the issuance of the Certificate of Substantial Completion.
- .2 Beginning of the warranty period and the period of exercise of the right of retention: The date of acceptance by the Departmental Representative and the Consultant of the declaration of substantial completion of the work submitted is the start date the period of exercise of the right of retention and the warranty period, unless otherwise prescribed by the regulations relating to the right of retention in force at the place of work.
- .5 Certificate of Final Completion:
 - .1 When all the aforementioned tasks are completed, submit a request for the work to be submitted for final inspection, which is carried out jointly by the Departmental Representative, the Consultant and the Contractor.
 - .2 If the work is deemed incomplete by the Departmental Representative and the Consultant, complete the items that were not performed, according to the list prepared by the Consultant, and submit a new inspection request .
 - .3 Final Certificate of Completion: When the Departmental Representative and the Consultant consider that the deficiencies and defects have been corrected and that the contractual requirements are met, submit a request for the production of a final certificate of completion. Works. The Representative of the Ministry then releases the Contractor from all its contractual obligations related to this contract.
 - .4 No request for acceptance of the work from the Contractor can be considered, unless it is accompanied or has been preceded by all the certificates, declarations of attestation and documents requested by the Consultant.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative and Consultant, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Departmental Representative and Consultant to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 In the month prior to Substantial Performance of the Work, submit to the Departmental Representative and Consultant, two final copies of operating and maintenance manuals in French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

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

- .1 Identify contents of each binder on spine.
- .4 Indicate the content of each notebook on a tab inserted in the pocket on the back of the notebook.
- .5 Indicate the following information on the cover page of each binding:
 - .1 The date of submission.
 - .2 The designation, location and number of the project.
 - .3 The name and address of the Contractor and all subcontractors.
 - .4 The table of contents of each booklet.
- .6 Organize content according to Specifications sections and the order in which they appear in the table of contents.
- .7 Provide for each section of the operation and maintenance manual, a tab separator on which must be indicated the title of the section in typing.
- .8 The text of the sections shall consist of printed data supplied by the manufacturer or typed data.
- .9 Drawings, diagrams and manufacturers' publications must be legible..
- .10 Provide 1:1 scaled CAD files in dwg format, by electronic transfer at the discretion of the Departmental Representative..

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 The manual is a structured compilation of operating and maintenance data comprising information, documents, as well as technical details, and describing the operation and maintenance of a component or system.
- .2 The guarantee management plan.
- .3 Copies of certificates of approval and other required certificates.
- .4 List of equipment, including service center:
 - .1 Information on the nameplate such as equipment number, trade name, dimensions, capacity or horsepower, model number, and serial number and test results.
 - .2 List of constituent parts.
 - .3 Details relating to the installation of the equipment.
 - .4 Instructions relating to the operation of the equipment and constraints.
 - .5 Equipment maintenance instructions.
 - .6 Indicate characteristic curves, with technical data and test results; also give the complete list as well as the commercial number of the parts which can be replaced.
- .5 Provide lists of power circuits (distribution panels), with indication of electrical characteristics, control circuits and telecommunications circuits.
- .6 Workshop drawings.

- .1 Bind separately complete set of final revised shop drawings and technical data sheets.
- .7 Drawings: the drawings are used to complete the technical sheets and to illustrate the relationship between the different elements of the equipment and systems; they include control and principle diagrams.
- .8 Typed text: as needed, to complete the technical sheets.
- .9 Give instructions in logical order for each intervention, incorporating manufacturer's instructions prescribed in Section 01 45 00 - QualityControl.
- .10 Training: refer to section 01 79 00.13 - Demonstration and training.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Within one month of final completion, the Contractor must provide the Consultant and Departmental Representative with an electronic PDF copy of the plans as executed, showing all changes marked in red.
- .2 Enter the following information:
 - .1 The location of interior service pipes and related works concealed in the construction, in relation to visible and accessible structural members;
 - .2 On-site modifications to dimensions and execution details;
 - .3 Changes made following requests for modification or instructions received on the site;
 - .4 Any changes made to plans issued for construction, in each specialty.

1.7 ELECTRONIC PROJECT FILE

- .1 The project file is a structured electronic compilation of information and documents, as well as technical details, relating to the project.
- .2 As indicated in section 01 11 00 - Summary of the work, the documents must be placed in the project file.
- .3 Name the files with reference to the relevant section of the specifications and classify them according to the list of section numbers indicated in the table of contents of the specifications.
- .4 If required, the Departmental Representative and the Consultant must have access to the most up-to-date documents and samples of the project file for inspection.
- .5 Record information as work progresses.
- .6 Do not conceal the works until the required information has been recorded.
- .7 Other documents: keep manufacturers' certificates, inspection certificates, records of on-site tests prescribed in each of the technical sections of the specifications.
- .8 If applicable, provide digital photos to be included in the project file.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Store paint and products liable to freeze in a heated and ventilated room.
- .2 Remove damaged or deteriorated items or products, replace them with new ones at no additional cost, and submit them to Departmental Representative for review.

1.9 WARRANTIES AND BONDS

- .1 Develop a warranty management plan including all warranty information.
- .2 Thirty (30) days before the meeting on guarantees prior to completion of the work, submit the management plan to the Departmental Representative for approval.
- .3 The guarantee management plan must include the actions and documents that ensure that the Departmental Representative can benefit from the guarantees provided for in the contract.
- .4 The plan must be presented in narrative form and it must contain sufficient detail to be later used and understood by maintenance and repair personnel.
- .5 Submit to Departmental Representative for approval prior to submission of each monthly payment estimate, information regarding warranties obtained during construction.
- .6 Except for items put into service with the authorization of the Departmental Representative, do not modify the warranty effective date before the date of substantial completion of the work has been determined.
- .7 Nine (9) months after the date of reception of the work, perform a warranty inspection in the company of the Departmental Representative.
- .8 The warranty management plan should include or indicate the following:
 - .1 List of all equipment, components, systems or work packages covered by a warranty, with, for each, the information indicated below:
 - .1 The name of the element, material, system or lot;
 - .2 Model and serial numbers;
 - .3 The location;
 - .4 The name and telephone number of manufacturers and suppliers;
 - .5 The effective date and the expiration date of the warranty.
 - .2 Roles and responsibilities of persons associated with various warranties, including contact points and telephone numbers of officials within the Contractor's organization, subcontractors, manufacturers or suppliers participating in the works.
 - .3 List and progress of warranty certificates for items and lots subject to extended warranties.
 - .4 The expression of the Contractor's intention to be present at the inspection scheduled nine (9) months after the completion of the work concerned.

- .9 Respond promptly to any verbal or written request for troubleshooting / repair work required under warranty.
- .10 All verbal instructions must be followed by written instructions.
 - .1 The Departmental Representative may take action against the Contractor if the latter does not respect his obligations.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

- .1 Section content: Training objectives, teaching material, training schedule, and roles and responsibilities of the various stakeholders.

1.2 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.3 TRAINEES

- .1 Trainees: personnel responsible for the operation and maintenance of the site, including the property manager, security personnel, the Owner and specialist technicians, as appropriate.
- .2 Trainees must be able to attend training sessions during the final stages of construction in order to become familiar with the equipment and systems installed.

1.4 INSTRUCTORS

- .1 The Contractor as well as the manufacturer's authorized personnel, factory trained and certified, provide training to participants in the following:
 - .1 Start-up / start-up, operation / operation and shutdown / decommissioning of components, equipment and systems concerned;
 - .2 Characteristics of control / regulation / control devices and systems, including:
 - .1 The reasons and results of these characteristics;
 - .2 The repercussions of the intervention of these devices and systems on the controlled equipment and systems;
 - .3 The set point adjustments.
 - .3 Instructions relating to the upkeep, maintenance and adjustment of affected components, equipment and systems.
- .2 The Contractor and the manufacturers provide training for the participants in the following:
 - .1 Commissioning / starting, operation / operation and shutdown / decommissioning of components, equipment and systems in the case of which they have certified the installation, carried out commissioning and carried out tests for the purpose of performance control .

1.5 TRAINING OBJECTIVES

- .1 The training should be sufficiently long and detailed to enable participants to acquire the knowledge and skills necessary to perform the following:

- .1 Ensure safe, reliable and cost-effective operation from the energy and financial standpoints of all equipment and systems installed, in normal mode, in emergency mode, and under all operating conditions;
- .2 Implement an effective program of continuous inspection and performance control of equipment and systems;
- .3 Implement an appropriate program of preventive maintenance, diagnosis and troubleshooting;
- .4 Keep documentation up to date;
- .5 Ensure the operation of equipment and systems under emergency conditions until the arrival of qualified personnel.

1.6 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality.
- .2 Training material must be written in French and English and include the following:
 - .1 Operating Manual.
 - .2 Maintenance Manual.
 - .3 Management Manual.
 - .4 TAB and PV Reports.
- .3 The Departmental Representative and operations and maintenance staff review and comment on manuals and training materials. The Contractor must modify the course material according to the comments within a reasonable period of 4 weeks following their issuance.
- .4 Manuals and materials used must be prepared to allow the same detailed level of training in subsequent sessions.
- .5 Additional teaching material:
 - .1 Multimedia presentations.
 - .2 Training videos provided by manufacturer.
 - .3 Checklist summarizing adjustment procedures for users
 - .4 Equipment installation plans and diagrams
- .6 The teaching material must be presented in a format in accordance with section 01 78 00 - Documents / items to be submitted on completion of the work and inserted in the operation and maintenance manuals.

1.7 SCHEDULING

- .1 Include in Commissioning Schedule time for training.
- .2 Deliver training during regular working hours, training sessions to be 3 hours in length.
- .3 Training to be completed prior to acceptance of facility.

1.8 RESPONSIBILITIES

- .1 Be responsible for:

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- .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials,
- .2 The Departmental Representative may ask the Contractor to make adjustments to the training and to the educational and audiovisual material used for this purpose.
- .3 Once the training is completed, submit a written report signed by the instructors indicating the name of the participants in the training and the date.

1.9 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
- .1 Functional requirements.
 - .2 System philosophy, limitations of systems and emergency procedures.
 - .3 Review of system layout, equipment, components and controls.
 - .4 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
 - .5 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
 - .6 Maintenance and servicing.
 - .7 Trouble-shooting diagnosis.
 - .8 Inter-Action among systems during integrated operation.
 - .9 Review of O&M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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Part 1 GENERAL

1.1 SUMMARY

- .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.

1.2 RELATED REQUIREMENTS

- .1 All of this Specifications.

1.3 ACRONYMS:

- .1 AFD - Alternate Forms of Delivery, service provider.
- .2 PV - Performance Verification.
- .3 O&M - Operation and Maintenance.
- .4 TAB - Testing, Adjusting and Balancing.
- .5 BMM - Building Management Manual.
- .6 Cx - Commissioning.
- .7 PI - Product Information.
- .8 EMCS - Energy Monitoring and Control Systems.

1.4 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.
Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.
 - .2 Ensure appropriate documentation is compiled into the BMM.
 - .3 Effectively train O&M staff.
- .2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
- .3 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
- .4 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

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- .5 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.5 COMMISSIONING OVERVIEW

- .1 Cx to be a line item of Contractor's cost breakdown.
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built [facility] is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.
- .4 Consultant will issue Interim Acceptance Certificate when:
 - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Consultant.
 - .2 Equipment, components and systems have been commissioned.
 - .3 O&M training has been completed.

1.6 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Consultant, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.7 PRE-CX REVIEW

- .1 Before Construction:
 - .1 Review Contract Documents, confirm by writing to Consultant.
 - .1 Adequacy of provisions for Cx.
 - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
 - .2 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
 - .3 Fully understand Cx requirements and procedures.

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- .4 Have Cx documentation shelf-ready.
- .5 Understand completely design criteria and intent and special features.
- .6 Submit complete start-up documentation to Consultant.
- .7 Have Cx schedules up-to-date.
- .3 Inform Consultant in writing of discrepancies and deficiencies on finished works.

1.8 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to Consultant before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.9 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Submit no later than 2 weeks after award of Contract:
 - .1 Name of Contractor's Cx agent.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
- .2 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 3 weeks prior to start of Cx.
- .3 Provide additional documentation relating to Cx process required by Departmental Representative and Consultant.

1.10 COMMISSIONING SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
 - .1 Approval of Cx reports.
 - .2 Verification of reported results.
 - .3 Repairs, retesting, re-commissioning, re-verification.
 - .4 Training.

1.11 COMMISSIONING MEETINGS

- .1 Convene Cx meetings following project meetings: Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart and as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.

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- .4 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .5 Meeting will be chaired by Consultant, who will record and distribute minutes.

1.12 STARTING AND TESTING

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.13 WITNESSING OF STARTING AND TESTING

- .1 Provide 10 days notice prior to commencement.
- .2 Departmental Representative and Consultant to witness of start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.14 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up procedures.
 - .3 Operational testing: document equipment performance.
 - .4 System PV: include repetition of tests after correcting deficiencies.
 - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Consultant after distinct phases have been completed and before commencing next phase.
- .4 Document required tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Consultant. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
 - .1 Minor equipment/systems: implement corrective measures approved by Consultant.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Consultant.

- .3 If evaluation report concludes that major damage has occurred, Consultant shall reject equipment.
- .4 Rejected equipment to be remove from site and replace with new.
- .5 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

- .1 Assemble start-up documentation and submit to Consultant for approval before commencement of commissioning.
- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.
 - .2 Pre-start-up inspection reports.
 - .3 Step-by-step description of complete start-up procedures.
 - .4 Start-up reports,
 - .5 Signed installation/start-up check lists.

1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.
- .5 Ensure that the certificate of interim acceptance of the work and the guarantees for the permanent heating system do not come into force before the entire system is restored to its initial state and that it is certified by the Expert- advice.

1.17 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.18 START OF COMMISSIONING

- .1 Notify Departmental Representative Consultant at least 10 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.19 COMMISSIONING PERFORMANCE VERIFICATION

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- .1 Carry out Cx:
 - .1 Under accepted simulated operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

1.20 WITNESSING COMMISSIONING

- .1 Commissioning activities should take place in the presence of the Departmental Representative, Consultant, operations and maintenance staff, the Property Manager, specialist users as appropriate.

1.21 AUTHORITIES HAVING JURISDICTION

- .1 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .2 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

1.22 SUNDRY CHECKS AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.23 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative and Consultant.
- .2 Report problems, faults or defects affecting Cx to Consultant in writing. Stop Cx until problems are rectified. Proceed with written approval from Consultant.

1.24 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Consultant.

1.25 ACTIVITIES UPON COMPLETION OF COMMISSIONING

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- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.26 TRAINING

- .1 In accordance with Section 01 79 00.13 - Demonstration and Training for Building Commissioning.

1.27 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.28 OCCUPANCY

- .1 Cooperate fully with Departmental Representative and operating and maintenance staff during stages of acceptance and occupancy of facility.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

DIVISION 03

Concrete

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 Groupe CSA (CSA).
 - .1 CSA A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA O121-08 (R2013), Douglas Fir Plywood.
 - .3 CSA O151-09 (2014), Canadian Softwood Plywood.
 - .4 CSA S269.1-16, Falsework and Formwork.
 - .5 CAN/CSA S269.3-M92 (R2003), Concrete Formwork.

1.2 QUALITY ASSURANCE

- .1 Quality Assurance: In accordance with Section 01 45 00 - Quality Control.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect formwork from damages.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.

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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Formwork Materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA O86.
 - .2 Form Release Agent: Proprietary, non-volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non-petroleum containing, non-toxic, low VOC.

PART 3 - EXECUTION

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels, and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.
- .6 Align form joints and make watertight.
 - .1 Keep number of form joints to a minimum.
- .7 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other Sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .8 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

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3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 Two (2) days for slab and abutments.
- .2 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI).
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International (ASTM).
 - .1 ASTM A143/A143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .2 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .3 CSA Group (CSA).
 - .1 CSA A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .3 CSA G40.20/G40.21-13 (R2014), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 Reinforcing Steel Institute of Canada (RSIC).
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for proprietary materials used in Cast-In-Place Concrete and additives, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Prepare reinforcement drawings in accordance with Manual of Standard Practice.

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- .2 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 List of reinforcements.
 - .3 Quantity of reinforcements.
 - .4 Sizes, spacings, locations of reinforcement

1.3 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by the Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 350, deformed bars to CSA G30.18.
- .3 Cold-drawn annealed steel wire ties: To ASTM A1064/A1064M.
- .4 Deformed steel wire for concrete reinforcement: To ASTM A1064/A1064M.
- .5 Welded steel wire fabric:
 - .1 Plain in accordance ASTM A1064/A1064M, fabricated from as drawn steel wire into flat sheets; sizes as indicated on Drawings.
 - .2 Finish:
 - .1 Galvanized: Hot dip galvanized after welding having Class A coating in accordance with ASTM A641/A641M.

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- .3 Provide in flat sheets only.
- .6 Chairs, bolsters, bar supports, spacers: To CSA A23.1/A23.2.
- .7 Tie Wire: 1.5 mm diameter annealed wire.

2.2 SOURCE QUALITY CONTROL

- .1 Upon request, provide the Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request inform the Departmental Representative of proposed source of supplied material.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 FIELD BENDING

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

3.3 PLACING REINFORCEMENT

- .1 Cutting or puncturing vapour retarder is not permitted; repair damage and reseal vapour retarder before placing concrete.
- .2 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

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- .4 Maintain cover to reinforcement during concrete pour.

3.4 FIELD QUALITY CONTROL

- .1 Site Tests: Conduct tests as follows in accordance with Section 01 45 00 - Quality Control.
 - .1 Reinforcing steel and welded wire fabric.
- .2 Inspection or testing by the Departmental Representative not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.5 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for proprietary materials used in Cast-In-Place Concrete and additives, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Concrete Hauling Time: Provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.
- .4 Quality Assurance Submittals:
 - .1 Submit in accordance with Section 01 45 00 - Quality Control.
 - .2 Mill Test Report: Upon request, submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.

1.3 QUALITY ASSURANCE

- .1 Provide to Departmental Representative, four (4) weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .2 Quality Control Plan: Provide written report to Departmental Representative verifying compliance concrete in place meets performance requirements.

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1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: Deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2 is prohibited.
 - .2 Deviations submitted for review by Departmental Representative.
- .2 Concrete Delivery: Ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.5 AMBIENT CONDITIONS

- .1 Placing concrete during rain or weather events damaging to concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold Weather Protection:
 - .1 Maintain protection equipment, in readiness on Site.
 - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
 - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot Weather Protection:
 - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
 - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

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PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

- .1 Quality Control Plan: Ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.2 MATERIALS

- .1 Portland Cement: GUb-SF.
- .2 Water: To CSA A23.1/A23.2.
- .3 Reinforcing Bars:
 - .1 Billet steel, grade 350, deformed bars to CSA G30.18, unless indicated otherwise.
- .4 Welded steel wire fabric:
 - .1 Plain in accordance ASTM A1064/A1064M, fabricated from as drawn steel wire into flat sheets; sizes as indicated on Drawings.
 - .2 Finish:
 - .1 Galvanized: Hot dip galvanized after welding having Class A coating in accordance with ASTM A1064/A1064M.
- .5 Premoulded Joint Filler:
 - .1 Bituminous impregnated fiberboard: To ASTM D1751.
- .6 Joint Sealer/Filler: Grey color to ASTM C920, Type M, Grade NS.
- .7 Other Concrete Materials: To CSA A23.1/A23.2.

2.3 MIXES

- .1 Performance Method for specifying concrete: To meet Departmental Representative's performance criteria, to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in CSA A23.1-A23.2 Standard.

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- .2 Departmental Representative to proportion concrete mix for normal including:
 - .1 Class of exposure: C-2.
 - .2 Intended application: Exterior.
 - .3 Aggregate: Maximum size 20 mm.
 - .4 Supplementary cementing materials: With minimum 20% "S" fly ash replacement, by kg/m³ of total cementitious material.
 - .5 Water/binding ratio: 0.45.
 - .6 Air content: 5 à 8%.
 - .7 Slump: At time and point of discharge 50 to 110 mm.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Provide Departmental Representative 48-hour notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Concrete delivery and handling to facilitate placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers, and other inserts required built in.

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- .2 Sleeves and openings minimum 100 mm x 100 mm not indicated, reviewed by Departmental Representative.

3.3 FINISHES

- .1 Formed surfaces exposed to view: Sack rubbed finish in accordance with CSA A23.1/A23.2.
- .2 Pavements, walks, curbs, and exposed site concrete:
 - .1 Screed to plane surfaces and use magnesium floats.
 - .2 Provide round edges and joint spacings using standard tools.
 - .3 Trowel smooth and provide lightly brushed non-slip finish.

3.4 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.5 SITE TOLERANCES

- .1 Concrete floor slab finishing tolerance: To CSA A23.1/A23.2.

3.6 FIELD QUALITY CONTROL

- .1 Concrete Testing: To CSA A23.1/A23.2 by testing laboratory designated and paid for by the Client.

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Cleaning of concrete equipment in accordance with Section 01 35 43 Environmental Procedures.
 - .1 Divert unused concrete materials from landfill to local approved facility by MELCC.
 - .2 Provide appropriate area on job site where concrete trucks can be safely washed.

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- .3 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location posing health or environmental hazard is prohibited.

END OF SECTION

DIVISION 26

Electrical

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 All spec sections.

1.2 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CSA C22.10-18, Code de Construction du Québec, Chapitre V = Électricité (Code canadien de l'électricité, Première partie et modifications du Québec).
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC).
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 DEFINITIONS

- .1 Electrical and electronic terms: Unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.

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- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .4 Certificates:
 - .1 Provide CSA certified equipment.
 - .2 Where CSA certified equipment is not available, submit such equipment to inspection authorities for approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: In accordance with General Conditions of Contract.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data, and to include to the end of work manual.
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment;
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures;
 - .3 Safety precautions;
 - .4 Procedures to be followed in event of equipment failure;
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.

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- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.6 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

- .1 Operating voltages: To CAN3-C235.
- .2 Motors, electric heating, control, and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above Standard.
 - .1 Equipment to operate in extreme operating conditions established in above Standard without damage to equipment.
- .3 Language operating requirements: Provide identification labels for control items in French.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide equipment in accordance with Section 01 61 00- Common Product Requirements.
- .2 Factory assemble control panels and component assemblies.

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2.3 WARNING SIGNS

- .1 Warning Signs: In accordance with requirements of inspection authorities.
- .2 Porcelain enamel signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
 - .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self-tapping screws.
 - .2 Sizes as follows:

NAMEPLATE SIZE	DIMENSIONS	NUMBER OF LINES	LETTERS' HEIGHT
Size 1	10 x 50 mm	1	3 mm high
Size 2	12 x 70 mm	1	5 mm high
Size 3	12 x 70 mm	2	3 mm high
Size 4	20 x 90 mm	1	8 mm high
Size 5	20 x 90 mm	2	5 mm high
Size 6	25 x 100 mm	1	12 mm high
Size 7	25 x 100 mm	2	6 mm high

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

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2.6 WIRING IDENTIFICATION

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

2.7 CONDUIT AND CABLE IDENTIFICATION

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

Type	Prime	Auxiliary
Up to 250 V	Yellow	--
Up to 600 V	Yellow	Green
Up to 5 kV	Yellow	Blue
Up to 15 kV	Yellow	Red
Telephone	Green	--
Other Communication Systems	Green	Blue
Fire Alarm	Red	--
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust-resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint electrical equipment with the Consultant color choice.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable and allows work to be realized in accordance with the manufacturer's instructions.

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3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1, except where specified otherwise.

3.3 NAMEPLATES AND LABELS

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

3.4 CONDUIT AND CABLE INSTALLATION

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

3.5 MOUNTING HEIGHTS

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

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.7 FIELD QUALITY CONTROL

- .1 Conduct following tests in accordance with Section 01 45 00- Quality Control.
 - .1 Power distribution system, including phasing, voltage, and grounding.
 - .2 Circuits originating from branch distribution panels.
 - .3 Systems: communications.
 - .4 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

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- .2 Megger 350-600 V circuits, feeders, and equipment with a 1,000 V instrument.
- .3 Check resistance to ground before energizing.
 - .2 Carry out tests in presence of Consultant.
 - .3 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of project.

3.8 SYSTEM STARTUP

- .1 Instruct Departmental Representative of operation, care and maintenance of systems, system equipment and components.

3.9 CLEANING

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 21 and 26 05 22.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
 - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements and the manufacturer's written recommendations.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

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- .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse and return of pallets as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of aluminum or copper sized to fit copper or aluminum conductors as required.
- .2 Clamps or connectors for armoured cable, flexible conduits or TECK cable, as required to: CAN/CSA-C22.2 No.18.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and cables:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

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**WIRE AND BOX
CONNECTORS (0-1000 V)**

- .3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65.
Replace insulating cap.
- .4 Install bushing stud connectors in accordance with relevant NEMA
Standards.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections 26 05 20 and 26 05 22.

1.2 REFERENCE STANDARDS

- .1 CAN/CSA C22.2.

1.3 PRODUCT DATA

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

PART 2 - PRODUCTS

2.1 BUILDING WIRES

- .1 Conductors: Stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 RWU90 XLPE for conductors in underground conduit.
- .3 Copper Conductors: Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, non-jacketed.

2.2 TECK 90 CABLE

- .1 Cable: In accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conductors:
 - .1 Grounding conductor: Copper as indicated.
 - .2 Circuit conductors: Copper, as indicated, size as indicated.
- .3 Insulation:
 - .1 Cross-linked polyethylene XLPE.
 - .2 Rating: 600 V.
- .4 Inner Jacket: Polyvinyl chloride material.
- .5 Metallic Armour: Interlocking aluminum or galvanized steel.

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- .6 Overall Covering: Thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7 Fastenings:
 - .1 One-hole zinc straps to secure surface cables 50 mm and smaller. Two-hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 1.5 m center distance.
 - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
 - .1 Watertight approved for TECK cable.

2.3 ARMoured CABLES

- .1 Conductors: Insulated, copper, size as indicated.
- .2 Type: AC90 - lead sheath over cable assembly and under metallic armour.
- .3 Metallic Armour: Aluminum strip.
- .4 Type: ACWU90 jacket over thermoplastic armour and compliant to applicable Building Code classification for this project, for cables installed in wet locations.
- .5 Connectors: Anti- short connectors.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using methods appropriate to local conditions, and approved by Departmental Representative.
- .3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

- .1 Install cable in conduit in accordance with Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.

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- .2 Terminate cables in accordance with Section 26 05 20- Wire and Box Connectors - (0-1000 V).
- .3 Cable Colour Coding: To Section 26 05 00 - Common Work Results for Electrical.
- .4 Conductor length for parallel feeders to be identical.
- .5 Lace or clip groups of feeder cables at distribution centers, pull boxes, and termination points.
- .6 Wiring in Walls: Typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .7 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
- .8 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend.

3.3 INSTALLATION OF BUILDING WIRES

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

3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)

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

3.5 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible on "U" channels.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 21.

1.2 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2 No.41-13, Grounding and Bonding Equipment (Tri-National Standard, with NMX-J-590ANCE and UL 467).
 - .3 CSA C22.2 No.65-13, Wire connectors (Tri-National Standard, with UL 486A-486B NMX-J-543-ANCE).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for connectors and terminations, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

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

PART 2 - PRODUCTS

2.1 CONNECTORS AND TERMINATIONS

- .1 Copper long barrel compression connectors to CSA C22.2 No.65, as required sized for conductors.
- .2 Contact aid for aluminum cables, where applicable.
- .3 3-, 4- or 2-way joint boxes, dry location type.

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PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.
- .2 Bond and ground as required to CSA C22.2 No.41.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 12 16.01.

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.
- .2 CSA Group (CSA).
 - .1 CSA Z32-09, Electrical Safety and Essential Electrical Systems in Health Care Facilities.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for grounding equipment, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Clamps for grounding of conductor: Size as indicated to electrically conductive underground water pipe.
- .2 Grounding conductors: Bare copper, annealed tinned stranded, diameter as indicated.
- .3 Insulated grounding conductors: Green, copper, size as indicated.
- .4 Ground bus: Copper, size as indicated, complete with insulated supports, fastenings, connectors.

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- .5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including, but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

3.2 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of primary 600 V system, and secondary 120/208 V system.

3.3 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, transformers, switchgear, duct systems, control panels, and distribution panels.

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3.4 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections 26 05 21 and 26 05 34.

1.2 REFERENCE STANDARDS

- .1 CAN/CSA 22.2.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for hangers and supports, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

- .1 "U" shape, size 41 x 41 mm, 2.5 mm thick, surface mounted.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Secure equipment to solid masonry, tile, and plaster surfaces with nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted "T" bar ceilings. Ensure that "T" bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit, or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic "U" channel members.

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- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.
 - .2 Support two or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use "U" channels at 1.5 m.
- .9 Provide metal brackets, frames, hangers, clamps, and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections 26 05 24 and 26 05 34.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.1-06, Canadian Electrical Code, Part 1, 20th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

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

2.2 CABINETS

- .1 Construction: Welded sheet steel, as indicated, hinged door, handle, 2-key lock latch, and catch.
- .2 Type E, Empty: Surface return flange, flush overlapping sides mounting as indicated.
- .3 Type T Terminal: Surface return flange, flush overlapping sides mounting as indicated containing sheet steel, 19-mm G1S (good on one side) plywood backboard.

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PART 3 - EXECUTION

3.1 SPLITTER INSTALLATION

- .1 Mount plumb, true, and square to building lines.
- .2 Extend splitters full length of equipment arrangement, except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous, but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.
- .3 Install terminal block as indicated in Type "T" cabinets.
- .4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.3 IDENTIFICATION

- .1 Equipment Identification: To Section 26 05 00 - Common Work Results for Electrical.
- .2 Identification Labels: Size 2 indicating voltage and phase, system name or as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 21.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications, and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality Assurance Submittals:
 - .1 Test reports: Submit certified test reports.
 - .2 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: Submit manufacturer's installation instructions.

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PART 2 - PRODUCTS

2.1 CONDUITS

- .1 Rigid Metal Conduit: To CSA C22.2 No. 45, hot-dipped galvanized steel treaded.
- .2 Electrical Metallic Tubing (EMT): To CSA C22.2 No. 83, with couplings with expanded ends.
- .3 Rigid PVC Conduit: To CSA C22.2 No. 211.2.
- .4 Flexible Metal Conduit: To CSA C22.2 No. 56, liquid-tight flexible metal steel or aluminum.
- .5 Flexible PVC Conduit: To CAN/CSA-C22.2 No. 227.3.

2.2 CONDUIT FASTENINGS

- .1 One-hole malleable iron straps to secure surface conduits 50 mm and smaller.
 - .1 Two-hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m center distance.
- .4 Threaded rods, 6-mm diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: To CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
Coating: Same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

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- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

- .1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas and in mechanical and electrical service rooms.
- .3 Surface mount conduits.
- .4 Use electrical metallic tubing (EMT), except where specified otherwise.
- .5 Use rigid PVC conduit underground and in corrosive areas.
- .6 Use liquid-tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .7 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than $1/10^{\text{th}}$ of its original diameter.
- .8 Mechanically bend steel conduit over 19 mm diameter.
- .9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .10 Install fish cord in empty conduits.
- .11 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .12 Dry conduits out before installing wire.

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3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended surface channels.
- .5 Do not pass conduits through structural members, except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections 26 05 34 and 26 05 20.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC).
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .3 Insulated Cable Engineers Association, Inc. (ICEA).
- .4 Sustainable Forestry Initiative (SFI).
 - .1 SFI-2010-2014 Standard.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for cables, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 CABLE PROTECTION

- .1 38 x 140 mm planks pressure treated with a water repellent preservative consisting of a colored clear solution, copper naphthenate or 5% pentachlorophenol.

PART 3 - EXECUTION

3.1 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.

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- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of color coded multiconductor control cables reel off in same direction during installation.
- .6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using qualified personnel.
 - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits, and grounds.
 - .1 Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance Tests:
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1,000 V megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests:
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .2 Ground shields, ground wires, metallic armour, and conductors not under test.
 - .3 High Potential (Hipot) Testing.

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- .1 Conduct hipot testing at original voltage manufacturer's recommendations
- .4 Leakage Current Testing:
 - .1 Raise voltage in steps from zero to maximum values as specified by manufacturer for type of cable being tested.
 - .2 Hold maximum voltage for specified time period by manufacturer.
 - .3 Record leakage current at each step.
- .7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.3 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections 26 28 16.02, and 26 05 20.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA-C22.2 No.47-M90(R2007), Air-Cooled Transformers (Dry Type).
 - .2 CSA C9-02(R2007), Dry-Type Transformers.
 - .3 CAN/CSA-C802.2-06, Minimum Efficiency Values for Dry Type Transformers.
- .2 National Electrical Manufacturers Association (NEMA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for dry type transformers, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for dry type transformers for incorporation into manual.

PART 2 - PRODUCTS

2.1 DESIGN DESCRIPTION

- .1 Design:
 - .1 Type: ANN.
 - .2 3-phase, 45 kVA power, primary voltage 600V, secondary voltage 120/208 V, 60 Hz.

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- .3 Outlets: Standard.
- .4 Insulation: Class H, 150°C of temperature elevation.
- .5 Basic Impulse Level : Standard.
- .6 Hipot: Standard.
- .7 Average sound level: Standard.
- .8 Impedance at 17°C: Standard.
- .9 Enclosure: CSA, removable metal front panel.
- .10 Mounting: Wall or floor.
- .11 Finish: In accordance with Section 26 05 00 - Common Work Results for Electrical.
- .12 Copper or aluminum windings.
- .13 Winding configuration to be as noted on drawings.
- .14 Phase shifting reducing harmonics shall be as indicated on drawings.
- .15 Voltage Regulation to be 4% or better.
- .16 Complying with NRCAN 2019.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Label size: 7.
- .3 Nameplate Wording: To be coordinate with the Client.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Mount dry type transformers, as indicated.
- .2 Ensure adequate clearance around transformer for ventilation.
- .3 Install transformers in level upright position.

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- .4 Remove shipping supports only after transformer is installed and just before putting into service.
- .5 Loosen isolation pad bolts until no compression is visible.
- .6 Make primary and secondary connections in accordance with wiring diagram.
- .7 Energize transformers after installation is complete.
- .8 Make conduit entry into bottom $\frac{1}{3}$ of transformer enclosure.

3.2 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by dry type transformers installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 24 16.01.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-National Standard with UL 489, and NMX- J-266-ANCE-2010).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for circuit breakers, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 BREAKERS - GENERAL

- .1 Moulded-case circuit breakers: To CSA C22.2 No. 5.
- .2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .3 Common-trip breakers: With single handle for multi-pole applications.
- .4 Circuit breakers with interchangeable trips as indicated.
- .5 Circuit breakers to have minimum interrupting current equal to existing.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

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

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2.3 MAGNETIC BREAKERS (DESIGN B)

- .1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 12 16.02.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA C22.2 No.4-04(R2009), Enclosed and Dead-Frost Switches.
 - .2 CSA C22.2 No. 31-10, Switchgear Assemblies.
- .2 Underwriters Laboratories (UL).
 - .1 UL 977-1994(R2009), Fused Power-Circuit Devices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for load break switches, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for load break switches for incorporation into manual.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials: Provide one set of arc-suppressing contacts for each size of switch supplied.

PART 2 - PRODUCTS

2.1 SWITCHES

- .1 Load Break Switches: To UL 977, CAN/CSA C22.2 No.4, and CSA C22.2 No. 31.

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- .2 Switches of continuous ampere rating, as indicated, load-break bolted contact type with accommodation for type HRC-J fuses.
- .3 Interrupting rating of 6 times continuous current on contacts on manual operation, 12 times on motorized operation. Interrupting capacity to withstand and close onto circuits having available fault currents of 200,000 A RMS symmetrical, with HRC-J fuses.
- .4 Switch blades and terminals silver plated copper with drilled holes and surface ground to ensure high quality surface contact.
- .5 Replaceable arc suppressing contacts of silver tungsten construction with first-in, last-out operation.
- .6 Positive switching action of operating mechanism independent of speed at which handle is operated.
- .7 Quick make, quick break, stored energy operating mechanism for manual closing operation.
- .8 Operating handle mechanically interlocked with fuse access door with provision for single padlocking in open position.
- .9 Operating mechanism arranged to prevent "teasing" operation of contacts.
- .10 Mechanism designed so that it is impossible to close switch without first charging opening spring.
- .11 Opening and closing springs of switch must be charged sequentially not simultaneously.
- .12 Opening of switch no longer than 7 Hz.
- .13 Switches to be front accessible for quick and easy installation or removal.
- .14 Removable interphase barriers and grid type.
- .15 Open type load break bolted contact switches for switchboard mounting.

2.2 ENCLOSURE

- .1 Design enclosure to withstand mechanical stresses associated with available fault current of 200,000 A RMS symmetrical.
- .2 Enclosure: to CSA Standards, wall mounting.

- .3 Enclosure access door with shatterproof wire reinforced glass inspection window for viewing switch operating mechanism and terminations.
- .4 Finish exterior in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .5 White interior finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install equipment in accordance with manufacturer's instructions.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Operate switch online under normal load conditions with Departmental Representative and prove out operating functions.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 12 16.01.

1.2 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CAN/CSA-C22.2 No.4-04(R2009), Enclosed and Dead-Front Switches (Tri-National Standard, with ANCE NMX-J-162-2004 and UL 98).
 - .2 CSA C22.2 No.39-13, Fuseholder Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for disconnect switches - fused and non-fused, and include product characteristics, performance criteria, physical size, finish, and limitations.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

- .1 Fusible, non-fusible, disconnect switch into CSA C22.2 No.4 accordance enclosure, sprinkler proof, size as indicated.
- .2 Provision for padlocking in on-off switch position by three locks.
- .3 Mechanically interlocked door to prevent opening when handle in "OFF" position.
- .4 Fuses: Size as indicated, HRC-J type.
- .5 Fuse holders: To CSA C22.2 No.39, relocatable and suitable without adaptors, for type and size of fuse indicated.
- .6 Quick-make, quick-break action.
- .7 "ON-OFF" switch position indication on switch enclosure cover.

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2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Indicate name of load controlled on size 4 nameplate.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install disconnect switches complete with fuses if applicable.

END OF SECTION

DIVISION 31

Earthworks

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International.
 - .1 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600kN-m/m³).
- .2 Ministère des Transports du Québec.
 - .1 CCDG 14.02, Cahier des charges et devis généraux.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordination: Arrange with Authority Having Jurisdiction for relocation of buried services that interfere with execution of work.
 - .1 Pay costs of relocating services.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Site Quality Control Submittals: Submit in accordance with Section 01 45 00 - Quality Control.
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.
 - .2 Submit results report as described in PART 3 - FIELD QUALITY CONTROL.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Sand and gravel and Granular MG-20 in accordance with 14.02 of CCDG.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Evaluation and Assessment:
 - .1 Before commencing work verify locations of buried services on and adjacent to site.

3.2 PREPARATION

- .1 Temporary erosion and sedimentation control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Sediment and erosion control plan, specific to site, that complies to requirements of Authorities Having Jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed.
- .3 Removal:
 - .1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
 - .2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.
 - .3 Remove obsolete buried services within 2 m of foundations: Cap cut-offs.

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3.3 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks, and perform work in accordance with regulations, whichever is more stringent.
- .2 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .1 Stockpile topsoil on site for later use.
- .3 Excavate as required to carry out work.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Departmental Representative when excavations are complete.
 - .3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
- .4 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground.
 - .1 Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.
- .5 Excavate for slabs and paving to subgrade levels.
 - .1 In addition, remove all topsoil, organic matter, debris, and other loose and harmful matter encountered at subgrade level.

3.4 BACKFILLING

- .1 Remove snow, ice, construction debris, organic soil, and standing water from spaces to be filled.
- .2 Compaction of subgrade: Compact existing subgrade under walks, paving, and slabs on grade, to same compaction as fill.
 - .1 Fill excavated areas with gravel and sand compacted as specified for fill.
- .3 Placing:
 - .1 Place backfill, fill and base course material in 300 mm lifts: Add water as required to achieve specified density.

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- .4 In trenches:
 - .1 Up to 300 mm above pipe or conduit: Sand placed by hand.
- .5 Under seeded and sodded areas: Use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
- .6 Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.
- .7 Against foundations (except as applicable to trenches and under slabs and paving): Excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.
- .8 Underground tanks: Use sand to bottom of granular base courses or to bottom of topsoil, as applicable.

3.5 GRADING

- .1 Grade so that water will drain away from buildings, walls, and paved areas, to catch basins and other disposal areas.
 - .1 Grade to be gradual between finished spot elevations shown on drawings.

3.6 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International (ASTM).
 - .1 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
 - .2 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).

1.2 DEFINITIONS

- .1 Excavation Classes: Two (2) classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: Solid material in excess of 1.00 m³ and which cannot be removed by means of heavy-duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: Excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified Excavation: Excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping, and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 mm.
- .4 Waste Material: Excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow Material: Material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled Fill Material: Material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

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- .7 Unsuitable Materials:
- .1 Weak, chemically unstable, and compressible materials.
- .2 Frost susceptible materials:
- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422.
- .2 Table:
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 2.00 mm | 100 |
| 0.10 mm | 45 - 100 |
| 0.02 mm | 10 - 80 |
| 0.005 mm | 0 - 45 |
- .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable Fill: Very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Preconstruction Submittals:
- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .2 Submit records of underground utility locates, indicating: Location plan of existing utilities as found in field.

1.4 QUALITY ASSURANCE

- .1 Qualification Statement: Submit proof of insurance coverage for professional liability.
- .2 Health and Safety Requirements:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

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1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert excess materials from landfill to local facility authorized by Departmental Representative.

1.6 EXISTING CONDITIONS

- .1 Buried Services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: Pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: Cap cut-offs.
 - .4 Size, depth, and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.
 - .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities, and structures encountered.
 - .7 Obtain from the Departmental Representative the appropriate instructions before removing a utility pipe or a work located in the excavation area. The Client will assume the costs of this work.
 - .8 Record location of maintained, re-routed, and abandoned underground lines.
 - .9 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks, and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

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- .3 Where required for excavation, cut roots, or branches as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 and Type 2 fill: Compliant with following requirements:
- .1 Crushed, pit run or screened stone, gravel, or sand.
- .2 Gradations to be within limits specified when tested to ASTM C117. Sieve sizes to CAN/CGSB-8.2.
- .3 Table:

Sieve Designation	% Passing	
Type 1	Type 2	
75.00 mm	--	100
50.00 mm	--	--
37.50 mm	--	--
25.00 mm	100	--
19.00 mm	75-100	--
12.50 mm	--	--
9.50 mm	50-100	--
4.75 mm	30-70	22-85
2.00 mm	20-45	--
0.425 mm	10-25	5-30
0.180 mm	--	--
0.075 mm	3-8	0-10

- .2 Type 3 Fill: Selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse, or other deleterious materials.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of Authorities Having Jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

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- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice, and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 PREPARATION/PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .4 Protect buried services that are required to remain undisturbed.

3.4 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated after area has been cleared of weeds and removed from site.
- .2 Strip topsoil to depths.
 - .1 Do not mix topsoil with subsoil.
- .3 Stockpile in locations as indicated Departmental Representative.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.
- .4 Dispose of unused topsoil off site.

3.5 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.6 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.7 EXCAVATION

- .1 Excavate to lines, grades, elevations, and dimensions, as indicated Departmental Representative.
- .2 Remove paving, demolished foundations and rubble, walks, concrete, and other obstructions encountered during excavation.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by CNESST.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft, or organic matter.
- .9 Notify Departmental Representative when bottom of excavation is reached.
- .10 Obtain Departmental Representative's approval of completed excavation.
- .11 Hand trim, make firm, and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

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3.8 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.
 - .1 Exterior side of perimeter walls: Use Type 3 fill to subgrade level. Compact to 95 % of corrected maximum dry density.
 - .2 Within building area: Use Type 1 to underside of base course for floor slabs. Compact to 95 % of corrected maximum dry density.
 - .3 Place unshrinkable fill in areas indicated.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.10 BACKFILLING

- .1 Areas to be backfilled to be free from debris, snow, ice, water, and frozen ground.
- .2 Do not use backfill material which is frozen or contains ice, snow, or debris.
- .3 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .4 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 48 hours after placing of concrete.

3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as indicated by Departmental Representative.
- .3 Reinstate lawns to elevation which existed before excavation.

- .4 Reinstatement pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstatement areas affected by Work as directed by Departmental Representative.
- .6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

DIVISION 32

Exterior Improvements

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International.
 - .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular Base: Material in accordance with following requirements:
 - .1 Crushed stone or gravel.

.2 Gradations to be within limits specified when tested to ASTM C117 ASTM C136. Sieve sizes to CAN/CGSB-8.2.

.1 Gradation Method #1 to:

Sieve Designation	% Passing		
(1)	(2)	(3)	
100.00 mm	--	--	--
75.00 mm	--	--	--
50.00 mm	100	--	--
37.50 mm	70-100	--	--
25.00 mm	--	100	--
19.00 mm	50-75	--	100
12.50 mm	--	65-100	70-100
9.50 mm	40-65	--	--
4.75 mm	30-50	35-60	40-70
2.00 mm	--	22-45	23-50
0.425 mm	10-30	10-25	7-25
0.180 mm	--	--	--
0.075 mm	3-8	3-8	3-8

.2 Gradation Method #2 to: Insert name of agency and material type, except that percentage finer than 0.075 mm not to exceed 8%.

.3 Material to level surface depressions to meet gradation (2) limits in accordance with Method #1.

.4 Liquidity limit: Not more than 25, according to ASTM D4318.

.5 Plasticity index: Not more than 6, according to ASTM D4318.

.6 Los Angeles degradation: To ASTM C131. Max. % loss by weight: 45.

.7 Crushed particles: At least 60% of particles by mass within each of following sieve designation ranges to have at least one (1) freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
50.00 mm	to	25.00 mm
25.00mm	to	19.00 mm
19.00 mm	to	4.75 mm

PART 3 - EXECUTION

3.1 PLACEMENT AND INSTALLATION

- .1 Place granular base after subgrade surface is inspected and approved in writing by Departmental Representative.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 Place material to full width in uniform layers not exceeding 300 mm compacted thickness.
 - .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .8 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment can obtain required material densities.
- .4 Compacting:
 - .1 Compact to density not less than 95% corrected maximum dry density.
 - .2 Shape and roll alternately to obtain smooth, even, and uniformly compacted base.
 - .3 Apply water, as necessary, during compacting to obtain specified density.
 - .4 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

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3.2 SITE TOLERANCES

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

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

3.4 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 American Association of State Highway and Transportation Officials (AASHTO).
 - .1 AASHTO M081-92-UL-04, Standard Specification for Cutback Asphalt (Rapid-Curing Type).
- .2 ASTM International.
 - .1 ASTM D140/D140M-09, Standard Practice for Sampling Bituminous Materials.
 - .2 ASTM D633-11, Standard Volume Correction Table for Road Tar.
 - .3 ASTM D1250-08, Standard Guide for Use of the Petroleum Measurement Tables.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions data sheets for asphalt tack coat and include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 QUALITY ASSURANCE

- .1 Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

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- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations.
- .2 Replace defective or damaged materials with new.
- .4 Deliver, store, and handle materials in accordance with ASTM D140.
 - .5 Provide, maintain, and restore asphalt storage area.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Anionic Emulsified Asphalt: To CAN/CGSB-16.2, grade: SS-1h.
- .2 Cut-back Asphalt: To AASHTO M081-92-UL, grade RC-70 or RC-250.
- .3 Water: Clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.
- .2 Pressure Distributor:
 - .1 Designed, equipped, maintained, and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distribute in uniform spray without atomization at temperature required.
 - .2 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .1 Measure temperature to closest whole number.

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- .3 Equipped with accurate volume measuring device or calibrated tank.
- .4 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .5 Cleaned if previously used with incompatible asphalt material.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 APPLICATION

- .1 Apply asphalt tack coat only on clean and dry surface.
- .2 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method approved by Departmental Representative.
- .3 Apply asphalt tack coat evenly to pavement surface at rate between 2 and 3 L/m² L/m².
- .4 Paint contact surfaces of curbs, gutters, headers, manholes, and like structures with thin, uniform coat of asphalt tack coat material.
- .5 Apply asphalt tack coat only when air temperature greater than 10°C and when rain is not forecast within 2 hours minimum of application.
- .6 Apply asphalt tack coat only on unfrozen surface.
- .7 Evenly distribute localized excessive deposits of tack coat by brooming.
- .8 Keep traffic off tacked areas until asphalt tack coat has set.

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- .9 Re-tack contaminated or disturbed areas.
- .10 Permit asphalt tack coat to set break before placing asphalt pavement.

3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 American Association of State Highway and Transportation Officials (AASHTO).
 - .1 AASHTO M320-10, Standard Specification for Performance Graded Asphalt Binder.
 - .2 AASHTO R29-08, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
 - .3 AASHTO T245-97 (2008), Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
- .2 Asphalt Institute (AI).
 - .1 AI MS-2-1994, Mix Design Methods for Asphalt Concrete and Other Hot-Mixes.
- .3 ASTM International.
 - .1 ASTM C88-05, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
 - .2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³)).
- .4 Government of Québec, Transport Québec.
 - .1 Cahier des charges et devis généraux (CCDG) - Infrastructure routières - Construction et réparation, édition 2013.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for asphalt mixes and aggregate, and include product characteristics, performance criteria, physical size, finish, and limitations.

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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aggregates: To CCDG.
 - .1 Crushed Granular MG 20b MG 20 MG 56.
 - .2 Natural Gravel 80-0.
 - .3 Gravel and sand.
- .2 Tack Coat: SS-1 to CCDG.
- .3 Unique Coat: ESG-14, To CCDG.
- .4 Granular Subbase: MG-20.
- .5 Granular Base: MG-112.
- .6 Traffic Paint: Yellow to MPI # 32.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied Departmental Representative.

3.2 FOUNDATIONS

- .1 Foundations for roadways comprise:
 - .1 300-mm compacted thickness of granular subbase MG-112.
 - .2 150-mm compacted thickness of granular base MG-20.

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- .2 Construction of granular foundations: To CCDG.
- .3 Compaction: Compact each lift of granular material to 95% maximum density to ASTM D698. Maximum lift thickness: 300 mm.

3.3 PAVEMENT THICKNESS

- .1 Pavements for roadways:
 - .1 Wear course: 70 mm of ESG-14 mix.

3.4 PAVEMENT CONSTRUCTION

- .1 Surface preparation: To CCDG.
- .2 Application of prime coat: To CCDG.
- .3 Construction of asphalt concrete: To CCDG.

3.5 TRAFFIC MARKINGS

- .1 Paint parking space divisions and other pavement markings in accordance with manufacturers recommendations and as indicated.
- .2 Use paint thinner in accordance with manufacturer's requirements.

3.6 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International.
 - .1 ASTM C136-13, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.
- .2 CSA Group.
 - .1 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for precast concrete unit paving, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: Company or person specializing in precast concrete paver installations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store off ground and in accordance with manufacturer's recommendations.

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- .2 Store and protect precast concrete units from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

- .1 Concrete Pavers: Re-use of pavers from dismantling. Replace damaged pavers with one of the same type.

2.2 BEDDING AND JOINT MATERIAL

- .1 Determine bedding sand hardness as follows:
 - .1 Randomly select single 1.4 kg sample from sand source;
 - .2 Dry sample for 24 hours at 115°C to 121°C;
 - .3 Obtain 3 sub-samples each weighing 0.2 kg by passing original sample several times through riffle box;
 - .4 Carry out sieve analysis test on each sub-sample in accordance with CSA A23.1/A23.2.
- .2 Remix each sub-sample and place in nominal litre capacity porcelain jar with two (2) 25-mm diameter steel ball bearings weighing 75 +/-5 g each. Rotate each jar at 50 rpm for six (6) hours. Repeat sieve analysis. Record individual and average sieve analysis.
- .3 For each sample tested, maximum increase in percentages passing each sieve and maximum individual percent passing is in accordance with table as follows:

Sieve Size	Maximum Increase	Maximum Passing
0.075 mm	2%	2%
0.150 mm	5%	15%
0.300 mm	5%	35%

- .4 Bedding and joint sand: Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.
- .5 Gradation: To CSA A23.1/A23.2, Table 4 - Grading Limits for Fine Aggregate, and CAN/CSA-A179, as follows:

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Sieve Designation	% Passing for Bedding Sand	Joint Sand
10.00 mm	100	--
50.00 mm	95-100	100
2.50 mm	80-100	95-100
1.25 mm	50-90	60-100
630 microns	25-65	--
600 microns	--	35-80
315 microns	10-35	--
300 microns	--	15-20
160 microns	2-10	--
150 microns	--	2-15

2.3 EDGE RESTRAINTS

- .1 Edge restraints shall be precast concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit paving installation in accordance with manufacturer's written instructions.

3.2 STRUCTURAL SURFACE

- .1 Verify that structural surfaces conform to levels and compaction required for installation of unit pavers.
- .2 Verify that top of structural surface (top of base) does not exceed plus or minus 10 mm of grade over 3 m straightedge.
- .3 Ensure that structural surface is not frozen or standing water is present during installation.

3.3 INSTALLATION OF EDGE RESTRAINTS

- .1 Install restraints true to grade, in accordance with manufacturer's recommendations.

3.4 PLACING OF BEDDING MATERIAL

- .1 Ensure bedding material is always not saturated or frozen until installation is complete.

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- .2 Spread and screed material on structural surface to achieve 25 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.
- .3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

3.5 INSTALLATION OF CONCRETE PAVERS

- .1 Lay pavers to pattern indicated. Joints between pavers: As recommended by manufacturer
- .2 Use appropriate end, edge, and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.
- .3 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.
- .4 Inspect, remove, and replace chipped, broken and damaged pavers.
- .5 Sweep dry joint sand material into joints.
- .6 Settle sand by vibrating pavers with plate compactor.
- .7 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1 m of unrestrained edges of pavers.
- .8 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each workday.
- .9 Sweep off excess joint material when installation is complete.
- .10 Final surface elevations not to exceed plus or minus 10 mm under 3 m long straightedge.

3.6 PRECAST CONCRETE UNIT CLEANING

- .1 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.
- .2 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations.
- .3 Final surface to be free of contamination.

3.7 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International.
 - .1 ASTM C117-13, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698-12e2, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .2 CSA Group.
 - .1 CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 2015.
 - .2 CSA B651-2012 Accessible Design for the Built Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, and limitations.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Border : Granite as existing.
- .2 Concrete Mixes and Materials: In accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Granular base:
 - .1 Type 1, 2, or 3 fill.
 - .2 Crushed stone or gravel.

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- .4 Fill Material: To following requirements:
 - .1 Type 1, 2 or 3 fill;
 - .2 Crushed stone or gravel.

PART 3 - EXECUTION

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
 - .1 Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150-mm layers and compact to minimum 95% of maximum dry density to ASTM D698.

3.2 GRANULAR BASE

- .1 Place granular base material to lines, widths, and depths, as indicated.
- .2 Compact granular base in maximum 150 mm layers to minimum 95% of maximum density to ASTM D698.

3.3 TOLERANCES

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3-m straight edge placed on surface.

3.4 BACKFILL

- .1 Allow concrete to cure for two (2) days prior to backfilling.
- .2 Backfill to designated elevations.
 - .1 Compact and shape to required contours as indicated.

3.5 CLEANING

- .1 Proceed with cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 Agriculture and Agri-Food Canada.
 - .1 The Canadian System of Soil Classification, 3rd Edition, 1998.
- .2 Canadian Council of Ministers of the Environment.
 - .1 PN1340-2005, Guidelines for Compost Quality.

1.2 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss on Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth, and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Quality Control Submittals:
 - .1 Soil testing: Submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 QUALITY ASSURANCE

- .1 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

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1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 TOPSOIL

- .1 Topsoil mixture of particulates, microorganisms, and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 50% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: Friable when moist.

PART 3 - EXECUTION

3.1 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as indicated after area has been cleared grasses and removed from site.
- .2 Stockpile in locations as indicated by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m.
- .3 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.
- .4 Protect stockpiles from contamination and compaction.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 Otherwise, notify the Departmental Representative and do not undertake the work before having received the latter's authorization.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones more than 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials, and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Spread topsoil in uniform layers not exceeding 100 mm.
- .2 For sodded areas keep topsoil 15 mm below finished grade.
- .3 Spread topsoil to following minimum depths after settlement.
 - .1 100 mm for seeded areas.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.

3.5 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil, and finish grading.

3.6 SURPLUS MATERIAL

- .1 Dispose of materials, except topsoil not required off site.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools, and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule sod laying to coincide with preparation of soil surface.
 - .2 Schedule sod installation when frost is not present in ground.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for sod, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.
- .4 Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.3 DELIVERY, STORAGE, AND HANDLING

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

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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Number One Turf Grass Nursery Sod: Sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Turf Grass Nursery Sod types:
 - .1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.
 - .2 Turf Grass Nursery Sod quality:
 - .1 Not more than 1 broadleaf weed and up to 1% native grasses per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1,500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Water:
 - .1 The Contractor must provide the necessary water.
- .3 Fertilizer:
 - .1 To Canada Fertilizers Act and Fertilizers Regulations.
 - .2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain written approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.

3.2 PREPARATION

- .1 Verify that grades are correct and prepared.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade to tolerance of plus or minus 8 mm.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline, and other deleterious materials off site.

3.3 SOD PLACEMENT

- .1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.
- .2 Lay sod within 24 hours of being lifted if air temperature exceeds 20°C.
- .3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .4 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.4 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Always keep pavement and area adjacent to site clean and free from mud, dirt, and debris.

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- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
 - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
 - .2 Maintain sodded areas weed free 95%.
 - .3 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .4 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.6 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted Consultant provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1,500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum two (2) times prior to acceptance.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period, This period is 1 year following final acceptance of the work :
 - .1 Water sodded Turf Grass Nursery Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
 - .2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.

- .3 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
- .4 Eliminate weeds by mechanical.

END OF SECTION