

**ELEVATORS REFECTION
CRD OF QUEBEC
2560 HOCHELAGA BOULEVARD, QUEBEC CITY, G1V 2J3**

SPEC BOOK - ARCHITECTURE

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**FOR SUBMISSION
SEPTEMBER 3 2021**

ELEVATORS REFECTION
CRD QUÉBEC
2560, BOUL. HOCHELAGA,
QUEBEC SPAC FILE: R. 112643

Section 00 01 07
SCEALS AND SIGNATURES

**For submission
SEPTEMBER 3 2021**

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- END OF THE SECTION -

Partie 1 General

1.1 WORK SCOPE

- .1 Generally, and without limitation, the work consists of:
 - .1 Selective demolition work,
 - .2 Major refurbishment of the building's two elevators (some components are retained) including complete refurbishment of the cabins
 - .3 Repair work on the elevator mechanical rooms
 - .4 Small-scale interior work related to the above, including
 - .1 Indoor systems
 - .2 Wrought metals
 - .3 Masonry
 - .4 Paintings
 - .5 Fire protection
 - .6 Floor coverings
 - .7 Door and frame replacement
 - .8 Etc.
- .2 Mechanical/electrical work in connection with the above work
- .3 Work outside the lean-to roof for :
 - .1 Modification in ventilation and other mechanical/electrical work
 - .2 Opening of the outer wall for moving the elevator traction machine (elevator 2 only)

1.2 WORK CARRIED OUT BY THIRD PARTIES

- .1 Work in cooperation with other contractors and carry out the instructions of the Departmental Representative.
- .2 Coordinate the work with that of other contractors. If the performance or result of any part of the work under this contract is dependent upon the work of another contractor, promptly report in writing to the Departmental Representative any deficiencies or defects which may affect the proper performance of the work.

1.3 LAW, LICENCE AND CERTIFICATE

- .1 The Contractor shall be required to obtain all permits necessary for the performance of the work. The Contractor shall comply with all federal, provincial or municipal regulations and any other laws or regulations pertaining to this work. The Contractor shall be responsible for any contravention of the relevant laws and regulations.
- .2 The Contractor shall assume (at his own expense) all obligations relating to safety measures required by the Quebec Occupational Health and Safety Act, as well as all costs arising from such obligations. Submit to the Ministère's Representative a copy of the applications submitted to the above authorities and the approval documents received.

- .3 The building permit from the City of Quebec is not required, as the building is on federal territory. However, if other permits are required by the nature of the work, the contractor is obliged to apply for them. The cost of this application will be assumed by the Contractor.

1.4 WORK ORDER

- .1 Carry out the work in stages, so that the Departmental Representative can have continuous use of the site during the work.
- .2 Coordinate the construction progress schedule with the owner's occupancy of the site and existing building during construction.
- .3 Steps to be taken
 - .1 Work should be done one lift zone at a time.
The order is left to the discretion of the contractor. However, there shall always be a working elevator. Prior to commencing work on an elevator area, the contractor shall give 14 days written notice and obtain approval from the departmental representative.
 - .2 Elevator area: includes elevator approaches, elevator mechanical rooms, and any other area where work is required for a given elevator.
 - .3 Plan the work to minimize the amount of time the elevators are out of service.
 - .4 Prior to commencing work on the first elevator zone, the 14-day notice applies and the contractor must submit a detailed schedule indicating all stages and duration of the outage.
- .4 Maintain access for firefighting purposes; also provide firefighting capabilities.

1.5 USE OF THE PREMISES BY THE CONTRACTOR

- .1 The site may be used without restriction until substantial completion of the work.
- .2 Use of the premises shall be restricted to areas necessary for the performance of the work, storage and access to allow:
 - .1 Partial occupation of the premises by the Ministry's Representative.
- .3 Coordinate the use of the premises as directed by the Departmental Representative.
- .4 Locate and pay for any additional work or storage areas required to perform the work under this contract.
- .5 Remove or modify the existing structure to avoid damage to the parts that must remain in place.
- .6 Repair or replace as directed by the Departmental Representative, for the purpose of connection to or harmonization with existing or adjacent work, those portions of the existing work that have been altered during construction.
- .7 Upon completion of the work, the existing structure must be in a condition equivalent to or better than the condition it was in before the work began.

1.6 OCCUPATION OF THE PREMISES BY THE DEPARTMENTAL REPRESENTATIVE

- .1 The Departmental Representative will occupy the premises for the duration of the construction and will continue normal business operations during this period.

- .2 Work with the Departmental Representative to schedule the work to reduce conflicts and facilitate the Department's use of the site.
- .3 The work to be carried out indoors will be coordinated with the Ministry's representative by establishing a schedule for the completion of the work.
- .4 During the work on elevator #2, temporary exterior partitions are required for the duration of the work as indicated in section 01 56 00, Temporary Access and Protection Works.

1.7 EXISTING UTILITIES

- .1 Before interrupting utility services, inform the Departmental Representative and the utility companies involved and obtain the necessary approvals.
- .2 If tapping or connection to existing utility lines is required, provide the Departmental Representative with 72 hours advance notice of the planned interruption of electrical or mechanical services. Ensure that the duration of interruptions is as short as possible. Carry out the work during the hours established by the local authorities having jurisdiction, with minimal interference with vehicular traffic and the Site Owner's operations.
 - .1 Complete power outages require 30 days notice to the customer department.
- .3 Prior to the commencement of work, identify the extent and location of utility lines in the work area and inform the Departmental Representative.
- .4 Submit to the Departmental Representative for approval a schedule for the shutdown or closure of active facilities or works, including the interruption of communications services or power supply. Adhere to the approved schedule and notify parties affected by the inconvenience.
- .5 Provide temporary utility services as specified in Section 01 51 00 - Temporary Utility Services.
- .6 When unlisted utility lines are discovered, immediately notify the Departmental Representative and document them.
- .7 Protect, relocate, or maintain in service utility lines that are functional. If non-functioning pipelines are discovered during the course of the work, block them off in a manner authorized by the authorities having jurisdiction.
- .8 Record the location of utility lines that are maintained, relocated or abandoned.
- .9 Construct barriers in accordance with Section 01 56 00 - Temporary Access and Protective Works.

1.8 REQUIRED DOCUMENTS

- .1 Keep a copy of each of the following documents on the job site.
 - .1 Contractual drawings.
 - .2 Contractual quotes.
 - .3 Addendum.
 - .4 Revised studio drawings.
 - .5 List of unreviewed shop drawings.
 - .6 Change orders.
 - .7 Other changes to the contract.

- .8 Reports of tests carried out on site.
- .9 Copy of the approved schedule.
- .10 Health and safety plan and other safety-related documents.
- .11 Other documents indicated.

1.9 WORK INSIDE THE BUILDING

- .1 Work in the existing building shall take place between the hours of 7:00 a.m. and 3:30 p.m. Monday to Friday. Comply with section 01 74 11- Cleaning, article 1.4.

1.10 SAFETY DURING WORK INSIDE THE BUILDING

- .1 The contractor shall mark out his work site in such a way as to ensure that no unauthorized person can gain access to the work areas or endanger his safety.
- .2 Where the work involves access to the elevator shaft, site fencing 6'0" (1830mm) high is required. Site fencing must be approved by the Ministry representative or the building manager prior to the start of the work.
- .3 At the end of the working days, the landing doors of the lifts under construction must be closed and locked and the recommended site fences in place.

1.11 CERTIFICATION OF CONTRACTORS AND EMPLOYEES.

- .1 The contractor must have a VOD security clearance.
- .2 All workers and suppliers, whoever they may be, must have their reliability rating.
- .3 In the event that points 1 and 2 above are not met, the contractor shall apply the following points:
 - .1 A security officer will be contracted by AAFC (Agriculture and Agri-Food Canada) to monitor the work (at Contractor's expense).
 - .2 The contractor will have 48 hours to notify AAFC (Agriculture and Agri-Food Canada) that work is planned for the interior of the existing building, indicating the day and time of the start of the work and the duration.
 - .3 If the Contractor fails to report to work, the cost of the security guard will be at the Contractor's expense, even if no work has been performed.
 - .4 The Contractor shall schedule a minimum of 4 hours of work at a time to make the presence of a Security Officer worthwhile.
- .4 Access to the building will be as follows:
 - .1 Workers will report to door #6 or #11 (to be determined by the Departmental Representative). They shall ring the bell so that the Security Guard can open the door for them.
 - .2 Workers will be required to check in and out.

1.12 TIMELINE FOR COMPLETION

- .1 The project period: see Public Services and Procurement Canada's solicitation.

Partie 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Partie 3	Execution
3.1	NOT APPLICABLE
.1	Not applicable.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 ACCESS TO THE SITE

- .1 Design, construct and maintain temporary means of access to the work site, including traffic lanes, ramps or ladders, separate from the finished work and in compliance with municipal, provincial or other regulations.
- .2 Contractor Personnel Parking: The contractor will be assigned parking spaces near the generator by the Department's representative.
- .3 Access to the building for workers will be through door # 6 or door # 11.
- .4 The entry of materials and the disposal of waste will be done through the garage door at the rear of the building.

1.3 USE OF THE PREMISES BY THE OWNER

- .1 The owner will occupy the premises for the duration of the construction and will continue its normal activities during this period.
- .2 Work with the Departmental Representative to schedule work to reduce conflicts and facilitate use of the site.
- .3 Site operations shall be maintained as normal.

1.4 USE OF PREMISES AND FACILITIES

- .1 Carry out the work with minimal disruption to the normal use of the site. In this regard, make arrangements with the Departmental Representative to facilitate the completion of the prescribed work.
- .2 Restrict use to areas determined by the Department's Representative for the performance of the work and storage. Specifically, the Contractor shall be required to mobilize his equipment, storage areas and site trailer to the location specified by the Department's Representative. Prior to the installation of the work site.

The Contractor shall submit to the Department Representative a layout plan showing trailer, storage, parking and trash container areas for approval.
- .3 Do not unduly accumulate materials, equipment, or materials in storage or in piles so as to clutter the premises. Move those that interfere with the work of the Departmental Representative.
- .4 During the entire construction period, do not use the site for lodging or temporary residence of the contractor's employees.
- .5 Maintain existing utilities and provide access to the site for contractor's personnel and vehicles.
- .6 Where security has been reduced due to the work, provide other temporary means to ensure the safety of property and persons on the premises.

- .7 Noise and dust: when work causing noise or dust is required (breaking concrete, drilling, demolition, blasting, blastrac or other) the contractor will have to advise the building manager at least 48 hours in advance and obtain his authorization before carrying out the work. If the noisy work is very short (less than 15 minutes) the contractor may, if the manager agrees, carry out this work during normal working hours. If, however, in the sole judgment of the building manager, the work is too disturbing for users, the work must be done before 8:00 a.m. or after 5:00 p.m. at no additional cost.

1.5 EXISTING SERVICES

- .1 Notify the Department Representative and utility companies of the planned interruption of services and obtain the required approvals.
- .2 If tapping into or connection to existing systems is required, notify the Department Representative 72 hours prior to the anticipated time of interruption of electrical services or mechanical systems. Ensure that the duration of interruptions is as short as possible. Conduct interruptions after the occupants' normal working hours, preferably on weekends.
 - .1 Complete power outages require 30 days notice to the customer department.
- .3 Ensure the circulation of the owner's personnel and vehicles.
- .4 Construct protective barriers in accordance with Section 01 56 00 - Temporary Access and Protective Structures.

1.6 SPECIAL REQUIREMENTS

- .1 Ensure that the Contractor's personnel working on the site are aware of and comply with regulations, including fire, traffic and workplace safety regulations.
- .2 Remain within the limits of the work and access roads.
- .3 Contractor's vehicle access to the work site shall be limited to the areas reserved for the work.

1.7 SMOKE AND FRAGRANCE FREE ENVIRONMENT

- .1 Respect the no-smoking rule. Smoking is not permitted anywhere on the site.

1.8 NOISE CONTROL

- .1 In the existing building, even in the work area, the use of electronic devices playing high volume radio or music is prohibited. This is for the peace of mind of the owner's employees.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Division 01 - General Requirements

1.2 ALLOCATIONS

- .1 N/A

1.3 REFERENCES

.1 DEFINITIONS

- .1 **Activity:** A specific piece of work carried out as part of a project. An activity normally has an expected duration, an expected cost, and expected resource requirements. Activities may be subdivided into tasks.
- .2 **Bar Chart (Gantt Chart):** A graphical representation of data related to the schedule of a project. In a typical bar chart, the activities or other elements of the project are presented from top to bottom on the left side of the graph, while the dates are presented at the top, from left to right; the duration of each activity is indicated by horizontal segments placed between the dates.
- .3 **Baseline:** the original approved plan (for a project, work package, or activity), taking into account approved changes in project scope.
- .4 **Cash flow:** projection of progress payment requests based on the cash-flow-aware construction schedule.
- .5 **Completion Milestone:** The event corresponding to the issuance of the [Interim Certificate of Completion] [Substantial Certificate of Completion] and the Final Certificate of Completion.
- .6 **Constraint:** An applicable restriction or limitation, internal or external to the project, that affects the completion of the project. Any item that affects the timing of an activity.
- .7 **Control:** comparison of actual and planned performance, analysis of variances, evaluation of possible solutions and implementation of appropriate corrective actions.
- .8 **Critical activity:** activity located on the critical path.
 - .1 It is most often established by the critical path method.
- .9 **Critical path:** a sequence of activities that determines the duration of the project. The critical path is generally the longest path between the beginning and the end of the project.
 - .1 The critical path is usually one in which all activities have a margin less than or equal to a certain value, often set at zero.
- .10 **Critical Path Method:** a network analysis technique that determines the flexibility of the sequence of activities (margin) on different logical network paths in the work schedule network and determines the minimum total project duration.
- .11 **Update Date:** The date the project status and progress was last determined and reported

for analysis, such as the sequence of activities and performance measures.

- .12 **Duration:** the total number of work periods required (excluding vacations and other non-working periods) to complete an activity or other project component.
 - .1 Duration is usually expressed in working days or work weeks.
- .13 **Earliest Completion Date:** According to the critical path method, the earliest time at which an activity (or project) can be completed given the logic of the network and, if applicable, the constraints imposed by the schedule.
 - .1 The earliest completion date may change depending on the progress of the project and changes to the project plan.
- .14 **Earliest start date:** According to the critical path method, the earliest time at which an activity (or project) can begin given the logic of the network and, if applicable, the constraints imposed by the schedule.
 - .1 The earliest start date may change depending on the progress of the project and changes to the project plan.
- .15 **End date:** the time when an activity ends.
 - .1 It is more often associated with a determinant, for example: actual, expected, estimated, planned, earliest, latest, baseline, target or current end date.
- .16 **Margin:** the length of time an activity can be delayed from its earliest start date without pushing back the end date.
 - .1 This opportunity exists for both PWGSC and the Contractor.
- .17 **Impact Analysis:** a schedule analysis technique that simulates a delay in an accepted construction schedule to help determine the potential impact of the delay on project completion.
- .18 **Negative shift:** modification of a logical relationship that delays the execution of the next activity.
- .19 **Latest finish date:** according to the critical path method, the latest time at which an activity (or the project) can be completed without delaying the achievement of a specified milestone (usually the project finish date).
- .20 **Latest start date:** according to the critical path method, the latest time at which an activity can begin without delaying the achievement of a specified milestone (usually the project end date).
- .21 **Positive shift:** modification of a logical relationship that speeds up the execution of the next task.
- .22 **Logical network:** see Project graph.
- .23 **Overall schedule:** summary program indicating key deliverables; task breakdown structure and milestones.
- .24 **Milestone:** an important point or event in the project's execution, most often corresponding to the completion of an important product (deliverable).
- .25 **Monitoring:** collecting information on project implementation, analysis, usually by comparison with the adopted plan; reporting.

- .26 **Non-critical activity:** activity whose delay does not affect the duration of the contract.
- .27 **Project control system:** a computerized system using commercial software.
- .28 **Project graph:** schematic representation of the logical relationships between the activities of a project.
 - .1 This representation is always designed to be read from left to right.
- .29 **Project Plan:** a formal, approved document used for both project execution and control.
 - .1 The primary purpose of the project plan is to support planning assumptions and decisions, to facilitate communication among stakeholders, and to establish baseline references for project scope, cost and schedule.
 - .2 A project plan may be summary or detailed.
- .30 **Project planning:** development and maintenance of the project plan.
- .31 Scheduling - Project Planning, Tracking and Control: A comprehensive system managed to track the execution of work against specific milestones.
- .32 **Timeline:** dates set for the execution of activities and the achievement of milestones in a project.
- .33 **Hours of Work:** number of working days based on a five (5) day work week, less holidays.
- .34 **Risk:** a more or less predictable event or situation, the occurrence of which will have a positive or negative impact on the project's objectives.
- .35 **Start date:** the time when an activity begins. It is more often associated with a determinant, for example: actual, expected, estimated, earliest, latest, baseline, target or current start date.
- .36 **Task Decomposition Structure:** a hierarchical decomposition, which takes into consideration the product (deliverable) to be achieved, of the work the Contractor must perform to achieve the project objectives and create the required products (deliverables). This structure organizes and defines the total scope of the project. The task definition becomes more detailed as you move down to a lower level. The task breakdown structure is broken down into work packages.

.2 References

- .1 Project Management Institute (PMI) Standards
 - .1 Project Management Body of Knowledge Guide (PMBOK Guide) - [4th Edition].
- .2 Practice Standard for Scheduling - [2011]

1.4 ADMINISTRATIVE PROCEDURES

.1 Project meetings

- .1 Participate in a meeting with the Departmental Representative no later than 15 working days after contract award to establish the requirements of the work and to define the approach to be used for its execution.
- .2 Participate in regular project progress meetings with the Departmental Representative specifically to discuss detailed schedule updates and contract changes.

- .2 Scheduling
 - .1 Ensure that the planning process is iterative and generally leads to top-down processing, with more details being added as planning and decisions are made about options and alternatives/replacements.
 - .2 Ensure schedule adherence by monitoring the project in detail to ensure the integrity of the critical path, comparing actual progress of individual activities with planned progress; review the progress of activities in progress but not completed.
 - .3 Monitor at sufficiently frequent intervals to allow for immediate identification and elimination of causes of delays.
- .3 Monitoring and Reporting
 - .1 As the project progresses, inform the team of changes to the schedule and their potential impact.
 - .2 Use narrative reports when advising on the severity of difficulties and the means to eliminate them.
 - .3 Begin the narrative report with a statement of the overall status of the project, followed by a summary of delays, potential problems, corrective actions, and criticality of the project status.
- .4 Requirements for the critical path method
 - .1 Ensure that the overall plan and schedule are workable and within the prescribed contract period.
 - .2 Revise general and implementation schedules deemed unworkable by the Department Representative and resubmit for approval.
 - .3 Change to the term of the contract
 - .1 Acceptance of a general schedule and a schedule of performance that provides for a shorter period of time than that specified does not constitute a change in the contract.
 - .2 Only a bilateral agreement can change the term of the contract.
 - .4 A general schedule and performance schedule that the Department Representative believes is workable and that provides a shorter time frame for completion of the work than that specified in the contract is considered to have a margin.
 - .5 The first milestone in the general or performance schedule will have a start date no earlier than the contract award date.
 - .6 Milestone completion dates shall be calculated from the overall plan and schedule using the time periods specified in the contract.
 - .7 For contracts with a latest completion date, [the date of issuance of the Interim Certificate] [the date of Substantial Completion] must coincide with the calculated date.
 - .8 Updates shall be calculated with a negative margin if the earliest completion date of the pre-issuance work for the provisional certificate is after the contracted completion date.
 - .9 Non-critical activity delays, which carry a margin, may be disallowed as a basis for time extensions.

- .10 The following means, among others, may not be used to suppress margins: [constraints built into the management software,] [preferential sequencing,] [special positive/negative shift logic restrictions,] [extended activity durations] [or] [imposed dates other than those required by the contract].
- .11 Take into account the normally anticipated inclement weather conditions and indicate them on the overall plan and schedule.
 - .1 The prescribed duration of the contract is based on normal occurrences of inclement weather.
- .12 Provide the necessary crews and manpower to meet the schedule and to complete the Work within the time frame specified in the Contract.
 - .1 It may be necessary to use multiple crews simultaneously, spread over multiple work sites and along multiple critical paths.
- .13 Arrange for the participation, both on and off site, of subcontractors and suppliers as required by the Departmental Representative in the planning, scheduling and updating of the system and in monitoring the progress of the work.
 - .1 Approval by the Departmental Representative of the original and modified systems does not relieve the Contractor of its duties and responsibilities under the Contract.
- .14 The contract award or start date, the rate of progress, the issuance of the Interim Certificate of Completion and the Final Certificate of Completion are defined project milestones and are essential conditions of the contract.

1.5 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Submit to the Departmental Representative a project control system to be used for planning, monitoring, and reporting progress.
- .3 Submit the project control system to the Department Representative for approval.
 - .1 Failure to submit all required items may result in the withholding of advance payments as per the federal GC5 Terms of Payment.
- .4 Indicate in the submission documents the costs of execution, preparation and reproduction of the schedule to be submitted.
- .5 Submit a letter certifying that the schedule has been prepared in collaboration with the major subcontractors.
- .6 Submit project planning, monitoring and control data as part of the initial schedule submission and monthly project status report as required by the Department Representative; provide the following.
 - .1 Files on CD, prepared with the Microsoft project software used for the original schedule, containing the necessary schedule and cash flow information, labeled with the date of the update, the characteristics of the update, and the name of the person responsible for the update.
 - .2 Bar graph representing the overall schedule.
 - .3 Bar chart representing the schedule.

- .4 List project activities, including milestones and logical links, primary networks, secondary networks, from project start to finish. Break down activities by number and provide a description; include start and finish dates, earliest and latest, durations, codes and margins.
- .5 Criticality report of activities and milestones, including total margin up to five (5) days used as the primary sorting criteria for quick identification of critical or sub-critical paths throughout the project. Provide start and finish dates, earliest and latest, and durations, codes, and margin for critical activities.
- .6 Progress report for earliest start sequence listing, for each trade, activities [to be started, or to be completed no later than two (2) months after the monthly update. Attach to the report a list of activity identification numbers, description and duration. The report must include columns for recording actual start and finish dates, remaining duration, and observations regarding action items.

1.6 QUALITY ASSURANCE

- .1 Retain the services of experienced personnel, qualified in scheduling, for a period from the start of construction to the issuance of the Certificate of Final Completion, including commissioning.

1.7 STRUCTURE OF TASK DECOMPOSITION

- .1 Prepare the work breakdown structure no later than 15 working days after the contract award date.
 - .1 Develop the structure on at least five (5) levels: project, project stages, elements, sub-elements and work packages.

1.8 PROJECT MILESTONES

- .1 Mandatory and recommended milestones are targets to be achieved on the critical path, according to the overall schedule and the performance schedule. These will be established at contract award with the Contractor.

1.9 GENERAL SCHEDULE

- .1 Structure and base the critical path on the task breakdown structure to maintain consistency throughout the project.
- .2 Prepare a comprehensive master schedule (represented by logic network with critical path) and consistent cash flow requirement projections, no later than 30 working days after the finalization agreement, to confirm the validity of defined milestones or alternatives.
 - .1 The general schedule will serve as a reference document.
 - .1 Revise the baseline as required by the Department Representative.
 - .2 As the work progresses, the Departmental Representative will review the baseline and return it, verified, no later than 15 working days thereafter.
- .3 Reconcile revisions to the overall schedule and cash flow projections with the previous baseline document to provide a continuous audit trail.
- .4 The initial and subsequent master schedules shall include the following:
 - .1 CD containing schedule and cash flow information, clearly labeled with the date of the update, the characteristics of the update, and the name of the person responsible for the update.

- .2 Bar chart showing coding, duration of activities, start/finish dates (early/late), total margin, percent complete, current status and budget expenditures.
- .3 Network showing coding, sequence (logic) of activities, total float, earliest/latest dates, current status and durations.
- .4 Actual/projected monthly cash flows, expressed on an annual basis and on a monthly basis and presented in graphical and numerical form.

1.10 IMPLEMENTATION SCHEDULE

- .1 **Provide**, no later than 15 working days after the date of contract award, a schedule (**.mpp files**) (represented by a logic diagram with critical path) illustrating the sequence of activities, their interdependencies and estimated durations. Attach to the schedule the milestones for the following activities.
 - .1 Shop drawings.
 - .2 Samples.
 - .3 Approvals.
 - .4 Purchasing.
 - .5 Construction.
 - .6 Installation.
 - .7 Landscaping.
 - .8 Testing.
 - .9 Commissioning and acceptance.
- .2 The critical path schedule shall cover a period of at least 7 months from the date of contract award. Each activity shall last approximately 15 days.
 - .1 The schedule shall show the critical path activities that remain to be completed until the final certificate of completion is issued. Details shall be shown as the project progresses.
 - .2 The schedule shall provide complete and thorough detail of activities for the duration of the project.
- .3 Align the activities of the implementation schedule with the core activities and approved milestones identified in the overall schedule.
- .4 The schedule shall clearly illustrate the sequence and interdependence of construction activities and indicate the following. Milestones must have a predecessor or successor.
 - .1 Start and completion of all work packages, including their major components; completion dates of intermediate milestones.
 - .2 Activities required for the purchase, delivery and installation of each major piece of equipment, supply, material and material, and for the completion of related work, including the following.
 - .1 The time required to submit the required documents/samples a first and second time, and for their verification.
 - .2 The time required to manufacture and deliver the manufactured products.
 - .3 The interdependence between procurement and construction activities.
 - .3 The schedule shall include sufficient detail to ensure proper planning and execution of the work. In general, activities shall be scheduled to last from three (3) to 15 working days.
- .5 The level of detail of the project activities shall reflect the sequence and interdependence of the

tasks defined in the contract and allow for coordination and tracking of activities. The flow of the project should be shown in a continuous sequence from left to right.

- .6 Ensure that non-margining activities, where possible, are calculated and clearly indicated on the logic network as an unbroken sequence of activities defining the "critical path". The more critical activities in the diagram, the more risky the schedule is considered.
- .7 Place change orders in the appropriate location and in the logical sequence of the schedule. Upon verification of the schedule, clearly identify and report to the Departmental Representative any implications of adding a new change order for review.

1.11 REVIEW OF THE WORK SCHEDULE

- .1 Allow five (5) working days for the Departmental Representative to review the proposed schedule.
- .2 Upon receipt of the verified schedule, make any necessary corrections to the original schedule. Submit the corrected schedule to the Department Representative for review no later than five (5) working days after receipt of the verified schedule.
- .3 Provide as soon as possible, as directed by the Department Representative, additional information necessary to validate the workability of the schedule.
- .4 Submission of the schedule indicates that the schedule meets the requirements of the contract and will be implemented in the sequence shown in the diagrams.

1.12 COMPLIANCE WITH THE IMPLEMENTATION SCHEDULE

- .1 Comply with the audited schedule.
- .2 Significant changes and deviations from the planned sequence, which result in delays, may be executed only after receipt of written approval from the Department Representative.
- .3 Identify activities that are behind schedule. Suggest measures to address the backlog.
 - .1 Measures may include the following.
 - .1 Increased staffing on site to perform the activities or work packages involved.
 - .2 Increase in the amount of materials and equipment.
 - .3 Use of overtime and additional workstations.
- .4 Submit to the Department's Representative the justification, schedule data, and supporting documentation necessary to obtain approval, if required, for an extension of the overall completion time or the completion time for an interim milestone. Submit, but not limited to, the following.
 - .1 Written documentation establishing that a delay exists based on revised activity logic, duration, and costs, including a duration impact analysis, and illustrating the consequences of each change or delay to the approved schedule.
 - .2 Summary schedule indicating how the change will be incorporated into the overall logic diagram. Perceived impact shall be demonstrated based on the date of the change. The status of the work at that time shall also be shown.
 - .3 Any other supporting evidence requested by the Departmental Representative.
 - .4 Do not assume the extension of the contract until written approval is received from the Department Representative.

- .5 In the event of a contract extension, indicate on the schedule that the planned margin for completion of the Work has been exhausted without compromising the accumulated margin.
 - .1 The Department Representative will determine the number of contract extension days that may be granted for the activity and task involved, based on schedule updates and other specific information.
 - .2 The impact of a construction delay will not be used as a reason to extend the completion date of the contract.

1.13 PROGRESS MONITORING AND REPORTING

- .1 The construction schedule kept on site shall indicate, on a continuing basis, the current status of progress. Arrange for the involvement of subcontractors and suppliers, both on and off site, as required, in planning, scheduling, updating and monitoring progress. Inspect the work at least once (1) per month, along with the Department Representative, to determine the status of each routine activity listed on the appropriate networks.
- .2 As the project progresses and changes are made, update the decomposition structure and task codes and reissue them.
- .3 Update the schedule once (1) per month. The update shall reflect the actual status of the project as of the last business day of the month (which is the update date). This update shall reflect activities completed as of that date, activities in progress, and changes to the network logic and project duration.
- .4 Actual start and end dates shall not be automatically updated using the default functions of the project management software.
- .5 Submit copies of the updated implementation schedule to the Department Representative.
- .6 Monthly progress monitoring and reports will be used as the basis for progress payment requests.
- .7 Submit a written report based on the schedule once (1) per month, indicating work completed to date, comparing actual progress to planned progress, and presenting current forecasts. The report shall include a summary of the project progress, identify problems, and indicate anticipated schedule delays and critical paths. Explain alternatives that would catch up with the schedule and mitigate any potential delays. The report should also include the following information.
 - .1 Description of progress of work.
 - .2 Outstanding items and status of permits, shop drawings, change orders, possible time extensions.
 - .3 Status of various milestones and completion dates.
 - .4 Current and anticipated problems, potential delays and corrective actions.
 - .5 Review of project progress and critical path status.

PARTIE 2 PRODUCT

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 All sections of the specification that refer to this section.

1.2 DEFINITIONS

- .1 Submissions for Action: Information in written and/or graphic format, and physical samples that require responsive action by the Department Representative. Unless otherwise specified in the individual specification sections, the following shall be considered "Submissions for Action."
 - .1 Technical sheets.
 - .2 Workshop drawings.
 - .3 Samples.
- .2 Informational Submissions: Information in written and/or graphic format, and physical samples that do not require significant action by the Department Representative. Unless otherwise specified in the individual specification sections, the following shall be considered "Informational Submissions":
 - .1 Certificates.
 - .2 Operation and maintenance sheets.
 - .3 Test and inspection reports.
 - .4 Delegated design calculations.
 - .5 Documents/items to be submitted upon completion of the work.
 - .6 Example guarantees.
 - .7 Manufacturer's installation instructions.
- .3 "Portable Document Format (PDF): A standard file format licensed by Adobe Systems used to represent documents in a device-independent "fixed format" document layout, and resolution-independent display.

1.3 ADMINISTRATIVE PROCEDURES

- .1 As soon as possible and in a predetermined sequence so as not to delay the work, submit the required documents and samples to the Departmental Representative for review. Delay in submission shall not constitute sufficient reason for an extension of time to complete the work and no such request will be granted.
- .2 Do not proceed with any work that requires the submission of documents and samples until the review of all submittals has been completed.
- .3 Specifications shown on shop drawings, data sheets, and samples of products and structures shall be expressed in metric (SI) units.
- .4 When items are not produced or manufactured in metric (SI) units or when characteristics are not given in metric (SI) units, converted values can be accepted.
- .5 Review the documents and samples prior to submission to the Department Representative. By this pre-verification, the Contractor confirms that the requirements applicable to the work have been or will be determined and verified, and that each of the documents and samples submitted have been reviewed and found to be in compliance with the requirements of the work and the contract

documents. Documents and samples that are not stamped, signed, dated, and identified in connection with the particular project will be returned without review and will be considered rejected.

- .6 Notify the Department Representative in writing at the time of submission of documents and samples of any deviations from the requirements of the contract documents and state the reasons for such deviations.
- .7 Ensure accuracy of field measurements relative to adjacent structures affected by the work.
- .8 The fact that submitted documents and samples are reviewed by the Department Representative does not relieve the Contractor of its responsibility to submit complete and accurate documents.
- .9 The fact that the submitted documents and samples are reviewed by the Department Representative does not relieve the Contractor of its responsibility to submit documents in accordance with the requirements of the Contract Documents.
- .10 Keep a verified copy of each submitted document on site.

1.4 SHOP DRAWINGS AND DATA SHEETS

- .1 The term "shop drawings" means drawings, schematics, illustrations, charts, performance or performance graphs, pamphlets, and other documentation required to be provided by the Contractor to show in detail any portion of the subject work.
- .2 Drawings shall bear the seal and signature of a qualified professional engineer recognized or licensed to practice in Canada, in the Province of Quebec.
- .3 The shop drawings shall indicate the materials to be used and the methods of construction, fastening or anchoring to be employed, and shall contain erection diagrams, details of connections, pertinent explanatory notes and any other information necessary for the performance of the work. Where structures or components are connected or joined to other structures or components, indicate on the drawings that the requirements are coordinated, regardless of the section under which the adjacent structures or components are to be supplied and installed. Make reference to the specifications and preliminary design drawings.
- .4 Allow 10 days for the Departmental Representative to review each batch of materials submitted.
- .5 Changes in the shop drawings by the Department Representative are not intended to vary the contract price. If they do, however, notify the Department Representative in writing before proceeding with the work.
- .6 Make changes to the shop drawings as requested by the Department Representative in accordance with the requirements of the contract documents. At the time of resubmittal of the drawings, notify the Department Representative in writing of any changes that have been made in excess of those required.
- .7 No data sheet or shop drawing will be reviewed unless the material information form is included and completed, data sheets and shop drawings will be automatically rejected.
- .8 Submitted materials must be accompanied by a cover letter containing the following information:
 - .1 The date;
 - .2 The project name and number;
 - .3 The name and address of the Contractor;
 - .4 The designation of each drawing, data sheet and sample and the number submitted;

- .5 Any other relevant data.
- .9 Submitted materials must bear or indicate the following:
 - .1 Date of preparation and review dates;
 - .2 The project name and number;
 - .3 The name and address of the following persons:
 - .1 The subcontractor;
 - .2 The supplier;
 - .3 The manufacturer;
 - .4 Contractor's stamp, signed by the Contractor's authorized representative, certifying that the submitted documents are approved, that the field measurements have been verified, and that the package conforms to the requirements of the Contract Documents;
 - .5 Relevant details for the portions of the work involved:
 - .1 Materials and manufacturing details;
 - .2 The layout or configuration, with dimensions, including those taken on site, and clearances and clearances;
 - .3 The details of the assembly or adjustment;
 - .4 Characteristics such as power, flow rate or capacity;
 - .5 Performance characteristics;
 - .6 Reference standards;
 - .7 The operational mass;
 - .8 Wiring diagrams;
 - .9 One-line diagrams and schematic diagrams;
 - .10 Links with adjacent structures.
- .10 Distribute copies of the shop drawings and data sheets once the Department Representative has completed the review.
- .11 Submit one (1) electronic copy of the shop drawings prescribed in the technical sections of the specifications and as reasonably required by the Department Representative.
- .12 If no shop drawing is required due to the use of a standard manufactured product, submit manufacturer's data sheets or documentation prescribed in the technical sections of the specification and required by the Department Representative.
- .13 Submit one (1) electronic copy of the test reports prescribed in the technical sections of the specifications and required by the Department Representative.
 - .1 The report signed by the official representative of the testing laboratory shall certify that materials, products or systems identical to those proposed in the work have been tested in accordance with the prescribed requirements.
 - .2 Testing must have been completed within three (3) years prior to the date of contract award.
- .14 Submit one (1) electronic copy of the certificates prescribed in the technical sections of the specifications and required by the Department Representative.

- .1 The documents, printed on the manufacturer's official correspondence paper and signed by a representative of the manufacturer, shall certify that the products, materials, equipment, and systems furnished conform to the specifications.
- .2 Certificates must be dated after contract award and indicate the project designation.
- .15 Submit one (1) electronic copy of the certificates prescribed in the technical sections of the specifications and required by manufacturer's instructions prescribed in the technical sections of the specifications and required by the Department Representative.
 - .1 Pre-printed documents describing the method of installation of products, materials and systems, including special instructions and material safety data sheets indicating impedances, risks and safety measures to be implemented.
- .16 Submit one (1) electronic copy of the certificates prescribed in the technical sections of the specifications and required by the manufacturer's field inspection reports prescribed in the technical sections of the specifications and required by the Department Representative.
- .17 Reports of tests and verifications performed by the manufacturer's representative to confirm compliance of installed products, materials, equipment or systems with the manufacturer's instructions.
- .18 Submit one (1) electronic copy of the operation and maintenance records prescribed in the technical sections of the specifications and required by the Department Representative.
- .19 Delete information that does not apply to the work.
- .20 In addition to the standard information, provide any additional details that apply to the work.
- .21 When the shop drawings have been viewed by the Department Representative and no errors or omissions have been found or only minor corrections have been made, the file will be returned and the fabrication and installation work can begin. If the shop drawings are rejected, the marked-up copy(ies) will be returned and the corrected shop drawings must be resubmitted as indicated above before fabrication and installation can proceed.
- .22 The Department Representative's exercise of the shop drawings is solely for the purpose of verifying that the data shown on the shop drawings is consistent with the general design.
 - .1 This exercise does not imply the Department Representative's approval of the preliminary design as presented in the Shop Drawings, which is the responsibility of the submitting Contractor, nor does it relieve the Contractor of the obligation to submit complete and accurate Shop Drawings and to comply with all requirements of the Work and Contract Documents.
 - .2 Without limiting the generality of the foregoing, it is important to note that the Contractor is responsible for the accuracy of confirmed field dimensions, the provision of information on forming methods or construction and installation techniques, and the coordination of the work performed by all trades.

1.5 SAMPLES

- .1 Submit three (3) product samples for review as specified in the technical sections of the specifications. Label the samples indicating their origin and intended destination.
- .2 Ship samples postage paid to the Department Representative's business office.
- .3 Notify the Department Representative in writing at the time of submission of product samples of deviations from the requirements of the contract documents.

- .4 When color, pattern or texture is specified, submit the full range of samples required.
- .5 Changes in samples made by the Department Representative are not intended to vary the contract price. If they do, however, notify the Department Representative in writing prior to commencing work.
- .6 Make such modifications to samples as may be requested by the Department Representative while complying with the requirements of the contract documents.
- .7 The reviewed and approved samples will become the standard against which the quality of materials and workmanship of the finished and installed work will be evaluated.

1.6 SAMPLES OF THE WORK

- .1 Perform the required samples of the Work in accordance with Section 01 45 00 - Quality Control.

1.7 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit, monthly with the progress report, one (1) copy of the standard resolution digital photograph file in jpg format.
- .2 Project identification: project name, project number and date of the photo.
- .3 Number of views:
 - .1 Viewpoints and their location will be determined by the Department Representative.
- .4 Photo submission frequency: weekly.
 - .1 Upon completion of foundation work, excavation, framing, and installation of utility lines, but prior to concealment of the structures, as directed by the Department Representative.

PARTIE 2 PRODUCT

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

- .1 Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Division 01 - General Requirements.

1.2 REFERENCES

- .1 Province of Quebec
 - .1 Act respecting occupational health and safety, R.S.Q., c. S-2.1
 - .2 Construction Safety Code , R.S.Q., c. S-2.1, r.4

1.3 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 – Documents / Samples to be Submitted.
- .2 Transmit to the Departmental Representative and to the CNESST the prevention program specific to the construction site, as described in the article "GENERAL REQUIREMENTS", at least 10 days before the beginning of the work.
- .3 The Departmental Representative will review the Contractor's prevention program for the site and provide comments to the Departmental Representative within 10 working days of receipt. If necessary, the Contractor will revise the prevention program and resubmit it to the Departmental Representative no later than 5 days after receiving the Departmental Representative's comments. The Department's Representative reserves the right not to authorize the start of work on the site until the content of the prevention program is satisfactory. The Contractor shall thereafter update its prevention program and submit it to the Department's Representative if the scope of work changes, if the Contractor's work methods differ from its original plans, or for any other applicable new conditions.
- .4 The Department Representative's review of the Contractor's prevention program for the site shall not be construed as an approval of that program and shall not limit the Contractor's overall responsibility for health and safety during construction.
- .5 Submit to the Departmental Representative, at least once a week, reports of health and safety inspections performed on the job site by the Contractor's authorized representative.
- .6 Submit to the Departmental Representative, within 24 hours, a copy of any inspection report, correction notice or recommendations issued by federal, provincial and territorial health and safety inspectors.
- .7 Submit to the Department Representative, within 24 hours, an investigation report for any injury accident and for any incident that highlights a potential hazard.

The investigation report shall contain at a minimum the following:

 - 1. date, time and place of the accident;
 - 2. name of the subcontractor involved in the accident;
 - 3. number of people involved and status of injuries;
 - 4. identification of witnesses;

5. detailed description of the tasks performed at the time of the accident ;
 6. equipment used to perform the tasks performed at the time of the accident ;
 7. corrective action taken immediately after the accident;
 8. causes of the accident;
 9. preventive measures put in place to avoid a similar accident.
- .8 Submit WHMIS Material Safety Data Sheets (MSDS) to the Departmental Representative in accordance with Section 01 33 00. The Contractor shall also keep a copy of these sheets on site.
- .9 Medical Surveillance : Where required by law, regulation or safety program, submit certification of medical surveillance of personnel working on the job site prior to commencing work. Submit to the Departmental Representative additional certification for any new employees working on the job site.
- .10 Submit an emergency response plan to the Department Representative along with the prevention program. This emergency response plan shall contain the elements listed in the "GENERAL REQUIREMENTS" section of this section.
- .11 Transmit to the Department's Representative a copy of the training certificates for site workers, including the following (when applicable):
- .1 Workplace first aid and cardiopulmonary resuscitation;
 - .2 work likely to emit asbestos dust (mandatory for any work in the presence of asbestos);
 - .3 work in confined spaces (mandatory for all work in confined spaces);
 - .4 Lockout (mandatory for all work requiring lockout);
 - .5 Safe driving of forklifts (mandatory for all forklift operations)
 - .6 Safe operation of elevating work platforms (mandatory for all use of elevating work platforms)
 - .7 any other training required by regulation or by the prevention program.
- In addition, the *General Health and Safety Course* certifications for *Construction materials* must be available on demand at the construction site.
- .12 Plans and Engineer's Certificates of Compliance: The Contractor shall forward to the Departmental Representative and the *Commission des normes, de l'équité, de la santé et de la sécurité du travail* (CNESST) a signed and sealed copy by a Professional Engineer of all plans that are required by the *Safety Code for Construction Work* (S-2.1, r.4), other legislation, regulations or other provisions of the specifications or contract. The contractor shall also submit a certificate of compliance signed by a professional engineer after the installation for which these plans were designed has been completed and before any person uses the installation. A copy of these documents must be available at all times at the job site.

1.4 PRODUCTION OF THE NOTICE OF COMMENCEMENT OF WORK

- .1 Before the start of the work, send the notice of commencement of work to the CNESST. Send a copy of the notice of commencement and the acknowledgement of receipt sent by the CNESST to the Ministry Representative.
- Upon completion of all work, the closure notice shall be forwarded to the CNESST, with a copy to the Departmental Representative.
- .2 The Contractor shall assume the role of prime contractor at all times within the limits of the work site and wherever else he is required to perform work on this project. The Contractor shall

acknowledge the responsibility of the prime contractor and so identify himself in the notice of commencement of work that he sends to the CNESST.

- .3 The Contractor shall agree to properly divide and identify the work site to define time and space at all times during the project.

1.5 RISK/HAZARD ASSESSMENT

- .1 Conduct a safety risk/hazard assessment of the work site as it relates to the execution of the work.

1.6 MEETINGS

- .1 Organize and lead a health and safety meeting with the Departmental Representative prior to the start of work.
- .2 A decision-making representative of the contractor shall attend all meetings where health and safety on the job site is discussed.
- .3 If it is anticipated that there will be 25 or more workers on the job site at any time during the course of the work, the contractor shall establish a site committee and hold meetings as required by the *Construction Safety Code* (S-2.1, r. 4). A copy of the minutes of the worksite committee meetings shall be forwarded to the Departmental Representative no later than 5 days following the date of the committee meeting.

1.7 REGULATORY REQUIREMENTS

- .1 Comply with all laws, regulations and standards applicable to the performance of the Work.
- .2 Observe prescribed standards and regulations to ensure the normal conduct of work on lands contaminated by hazardous or toxic materials.
- .3 Always use the most current version of the standards referenced in the *Safety Code for Construction* (S-2.1, r.4), notwithstanding the date indicated in that *Code*.

1.8 COMPLIANCE REQUIREMENTS

- .1 Comply with the *Act respecting occupational health and safety* (R.S.Q., c. S-2.1) and the *Safety Code for the Construction Industry* (S-2.1, r. 4.) in addition to complying with all requirements of these specifications.

1.9 RESPONSIBILITIES

- .1 The Contractor shall accept and assume all the duties and obligations normally devolved upon the prime contractor under the *Act respecting occupational health and safety* (R.S.Q., chapter S-2.1) and the *Safety Code for the Construction Industry* (S-2.1, r.4).
- .2 The Contractor shall be responsible for the health and safety of persons on the work site and for the protection of property on the work site and shall be responsible for the protection of persons and the environment in the areas adjacent to the work site to the extent that they are affected by the work.
- .3 Regardless of the size and location of the work site, the Contractor shall clearly delineate the boundaries of the work site by physical means and shall comply with specific regulatory requirements. The means selected to delineate the work site shall be submitted to the Departmental Representative.

- .4 Comply with, and have employees comply with, the safety requirements set out in the applicable local, territorial, provincial and federal contract documents, ordinances, laws and regulations, and in the prevention program prepared for the site.

1.10 WORK PERFORMED BY EXTERNAL CONTRACTORS

- .1 On this job site, it is anticipated that the following work will be performed by an outside contractor not engaged by the Contractor:
- .2 The Contractor shall take such steps as are necessary to protect the health and safety of outside contractors who are not under contract to the Contractor but who are authorized by the Departmental Representative to perform certain work. In return, these outside contractors are required to submit to the authority of the Contractor (prime contractor). A subordination agreement shall be signed by the Contractor and each outside contractor to this effect and provided to the Departmental Representative prior to the commencement of work by each outside contractor (see wording in the OHS SUBORDINATION AGREEMENT section).

1.11 GENERAL REQUIREMENTS

- .1 Prior to commencing work, develop a site-specific prevention program based on a pre-assessment of risks/hazards in accordance with the "ASSESSMENT OF RISKS/HAZARDS" and "WORKSITE RISKS" sections of this section. Implement and enforce this program at all times until all site personnel have been discharged. The prevention program must take into account the particularities of the project and must cover all work performed on the site.

The prevention program should include at least the following elements:

- .1 company health and safety policy;
- .2 description of the stages of the work;
- .3 total cost of work, schedule and projected staffing curve;
- .4 Health and safety responsibility chart;
- .5 physical and material organization of the site;
- .6 identification of the risks for each stage of the work, corresponding prevention measures and implementation methods;
- .7 identification of preventive measures related to the specific risks inherent to the work site as indicated in the article RISKS INHERENT TO THE WORK SITE;
- .8 identification of preventive measures for the health and safety of employees and/or the public at the work site as indicated in the section SPECIFIC REQUIREMENTS FOR OCCUPANT AND PUBLIC HEALTH AND SAFETY;
- .9 training required;
- .10 accident/injury procedure;
- .11 written commitment from all stakeholders to comply with this prevention program;
- .12 site inspection grid based on preventive measures;
- .13 emergency response plan, which shall contain at least the following elements:
 - .1 procedure for evacuating the site;
 - .2 identification of resources (police, fire, ambulance, etc.);
 - .3 identification of responsible persons on the site;
 - .4 identification of the rescuers;

- .5 Communication flowchart (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.

The Departmental Representative will provide the Contractor with the site evacuation procedure, if applicable, and the Contractor shall match the site procedure with the site procedure and forward it to the Departmental Representative.

- .2 The Department Representative may provide written comments if there are deficiencies or concerns with the prevention program and may require submission of a revised program that will correct the deficiencies or eliminate the concerns.
- .3 In addition to the prevention program, during the course of the work the Contractor shall develop and submit to the Department Representative a specific written procedure for any work with a high risk of accidents (e.g., demolition procedure, special installation procedure, lifting plan, confined space entry procedure, electrical shutdown procedures, etc.) or as requested by the Department Representative.
- .4 The Contractor shall plan and organize the work in such a way as to encourage the elimination of hazards at the source or collective protection and thus minimize the use of personal protective equipment.
- .5 Equipment, tools or guards that cannot be installed or used without endangering the health and safety of workers or the public are deemed to be inadequate for the work to be performed.
- .6 All mechanical equipment (examples: personnel or material hoists, excavators, concrete pumps, concrete saws, but not limited to) shall be inspected prior to delivery to the site. The Contractor shall obtain a certificate of inspection signed by a mechanic and dated within one week prior to the arrival of each piece of equipment at the job site, and shall retain it at the job site and provide it to the Department Representative upon request.
- .7 Ensure that all inspections (daily, periodic, annual, etc.) of personnel or material lifting equipment required by applicable standards are performed and be able to provide a copy of the inspection certificates upon request by the Department Representative.
- .8 The Department Representative may at any time, if he or she suspects a defect or a risk of accident, order the immediate shutdown of any equipment and require an inspection by a specialist of his or her choice.
- .9 The Department Representative shall be consulted for the location of gas cylinders and tanks on the job site.

1.12 SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND THE PUBLIC

- .1 The site where the work will take place is occupied by employees and/or the public during the following periods: The entire time of the work, although these persons will not have access to the Contractor's site: The Contractor shall consider the following specific requirements for the protection of employees and/or the public:
 - .1 Work inside the existing building will be done during daylight hours.

These requirements shall be included in the Contractor's prevention program along with all other measures planned by the Contractor to protect the health and safety of employees and/or the public on the site.

1.13 UNFORESEEN RISKS/HAZARDS

- .1 When a source of hazard not specified in the contract documents and not identifiable during the preliminary inspection of the work site appears by reason of or during the performance of the work, the Contractor shall immediately stop the work, notify the person responsible for health and safety on the work site, put in place temporary protective measures for workers and the public, and notify the Department Representative verbally and in writing. The Contractor shall thereafter make the necessary changes to the prevention program and implement the necessary safety measures so that the work can resume.

1.14 PERSON RESPONSIBLE FOR HEALTH AND SAFETY

- .1 If the work site meets the criteria of section 2.5.3 of the *Safety Code for the Construction Industry* (S-2.1, r.4), the Contractor shall hire a competent and authorized person as a safety officer and assign him/her on a full-time basis as soon as the work begins. The duties of this person shall be dedicated exclusively to the management of health and safety on the site. The safety officer must meet the following criteria:

- .1 hold a security guard certificate issued by the CNESST for a minimum of 10 years;
- .2 Have hands-on experience on a job site where related activities similar to those of the project are conducted;
- .3 Have a working knowledge of workplace health and safety regulations
- .4 be responsible for the Contractor's occupational health and safety training sessions and ensure that only those persons who have successfully completed the required training have access to the site to perform the work;
- .5 assume responsibility for the implementation, detailed compliance and monitoring of the health and safety plan prepared for the site by the Contractor;
- .6 be present at all times on the site during the execution of the work;
- .7 Inspect the work and ensure compliance with all regulatory requirements and those specified in the contract documents or prevention program;
- .8 keep a daily log of its interventions and send a copy to the Department Representative at least once a week.

The safety officer's certification must be forwarded to the Department Representative prior to the start of work.

- .2 When a safety officer is not required or is hired by the Departmental Representative, the Contractor shall appoint a competent person as supervisor and person in charge of health and safety regardless of the size of the work site or the number of workers present. This person shall be present at all times on the work site and shall be able to take all necessary measures to ensure the health and safety of persons and property on the work site and in the immediate environment of the work site that may be affected by the progress of the work. The Contractor shall forward the name of such person to the Department Representative prior to the commencement of the work.

1.15 DOCUMENT DISPLAY

- .1 Ensures that relevant documents, items, orders and notices are posted in a prominent location on the site in accordance with provincial legislation and regulations and in consultation with the Departmental Representative.
- .2 At a minimum, the following information and documents must be posted in a location easily accessible to workers:
 - .1 notice of commencement of work;
 - .2 identification of the project manager;
 - .3 company's OHS policy;
 - .4 specific prevention program for the site;
 - .5 contingency plan;
 - .6 minutes of the site committee meetings;
 - .7 names of representatives on the worksite committee;
 - .8 name of the rescuers;
 - .9 intervention and correction reports issued by the CNESST.

1.16 INSPECTIONS AND CORRECTIVE ACTION IN CASE OF NON-COMPLIANCE

- .1 Inspect the work site, complete the site inspection grid and submit it to the Department Representative in accordance with "DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION" in this section.
- .2 Immediately take the necessary measures to correct situations deemed to be non-compliant found during the inspections mentioned in the previous paragraph or found by the competent authority or by the Department Representative or his or her agent.
- .3 Provide the Department Representative with a written report of actions taken to correct health and safety noncompliance.
- .4 The Contractor shall give the Safety Officer or, where there is no Safety Officer, the person appointed to deal with health and safety, full authority to order the stopping and resumption of the work when he deems it necessary or desirable for health and safety reasons. He/she shall ensure that the health and safety of the public and site personnel and the protection of the environment shall always take precedence over matters relating to the cost and schedule of the work.
- .5 The Department Representative or his designee may order the work to be stopped if the Contractor fails to correct any condition found to be noncompliant with respect to health and safety. Without limiting the foregoing, the Departmental Representative or designee may also at any time order a stop work order if, in his or her opinion, there is a danger or risk to the health or safety of site personnel or the public or to the environment.

1.17 PREVENTION OF VIOLENCE

- .1 Public Works and Government Services Canada's worksite health and safety management includes the implementation of measures to protect the psychological health of all persons accessing the work site. In addition to physical violence, verbal abuse, intimidation and harassment are not tolerated on the site. Any person who exhibits such actions or behaviors will receive a warning and/or may be permanently removed from the work site by the Department Representative.

1.18 DYNAMITAGE

- .1 Blasting or other use of explosives is permitted only if written instructions are received from the Department Representative.
- .2 Any operation involving explosives must be carried out under the immediate supervision of a qualified blaster.
- .3 The purchase, transportation, storage and use of explosives must comply with the provisions of applicable federal and provincial laws:
 - .1 Canada: *Explosives Act* (E-17), *Explosives Regulations* (C.R.C. CH. 599), *Standard for Blasting Cap Explosives*, *Transportation of Dangerous Goods Act and Regulations*.
 - .2 Quebec: *Explosives Act* (E-22), *Explosives Regulations* (E-22, r.1), *Safety Code for Construction Work* (S-2.1, r.4), *Regulation respecting the transportation of dangerous goods*.
- .4 The Contractor shall obtain all permits required under the above laws and regulations and keep a copy readily available at the job site.
- .5 The Contractor shall facilitate the visit of the site and explosives depots and the inspection of vehicles used for their transportation to all government officials and police officers having jurisdiction over explosives.

1.19 CARTRIDGE DEVICES

- .1 Use cartridge operated devices only with written permission of the Department Representative.
- .2 Every person who uses a sealer must be certified and meet all the requirements of Section 7 of the *Safety Code for the Construction Industry* (S-2.1, r. 4).
- .3 All other cartridge devices must be used as directed by the manufacturer and in accordance with applicable standards and regulations.

1.20 USE OF THE PUBLIC HIGHWAY

- .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, digging work, etc.), the Contractor shall obtain, at his own expense, all authorizations and permits required by the competent authority.
- .2 The Contractor shall install, at his own expense, all signage, barricades and other devices required by regulation to ensure the safety of the public and his own facilities.

1.21 LOCKING

- .1 For any work on equipment powered by electricity or any other energy source, the Contractor shall forward a general lockout procedure to the Department Representative and implement it.
- .2 Supervisory personnel and all workers involved in work requiring lockout shall have received training on lockout from a recognized organization; the Contractor shall forward the training certificates to the Department Representative.
- .3 Prior to undertaking lockout of equipment at an occupied site, the Contractor shall coordinate with the site representative if the disconnection of power sources may affect site operations or occupants.

- .4 The Contractor shall identify a qualified person as being responsible for lockout and shall ensure that this person prepares a lockout sheet for each piece of equipment that is to be locked out. The lockout sheet must be submitted to the Department Representative at least 48 hours before the work begins, who will have it verified by a site representative if the work is in an existing building. 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 locked out;
 - .3 identification of the energy sources that supply the equipment;
 - .4 identification of each of the cut-off points;
 - .5 sequence of lockout/tagout and sequence of lockout/tagout;
 - .6 list of required lockout equipment;
 - .7 method of verification of the zero energy setting;
 - .8 name and signature of the person who wrote the form;
- Upon request by the Department Representative, the Contractor shall record all such information on the Site Representative's form.
- .5 At the time of lockout, the person in charge should date the card and ensure that each worker involved in the work on the locked circuit/equipment signs the card.

1.22 ELECTRICAL WORK

- .1 The Contractor shall ensure that all work of an electrical nature is performed by employees qualified in accordance with provincial qualification and training regulations.
- .2 The Contractor shall comply with the requirements of CSA Z462 *Electrical Safety in the Workplace*.
- .3 All work on electrical equipment must be done without power unless it is not possible to completely disconnect the equipment.
- .4 The Contractor shall comply with all requirements of the "Lockout" paragraph of this section.
- .5 The Contractor shall notify the Department Representative in writing of any work that cannot be done off-line and obtain his authorization. The Contractor shall demonstrate to the Departmental Representative that it is not possible to perform the work off-line and shall provide all the information necessary to complete and obtain a live working permit (work method, arc level assessment, protective perimeter, protective equipment, etc.) prior to the commencement of the work, except for the exceptions provided for in the CSA Z462 Electrical Safety Standard.
- .6 The Live Work Permit shall contain at a minimum the following:
 - a. description of the circuit and equipment and location;
 - b. justification of the need to do the work under voltage;
 - c. description of safe work practices to be adopted;
 - d. conclusions of the electric shock hazard analysis;
 - e. delimitation of the protection perimeter against electric shocks;
 - f. conclusions of the arc flash hazard analysis;
 - g. description of the arc flash protection perimeter;

- h. description of the personal protective equipment required;
 - i. description of means to restrict access to unqualified persons;
 - j. evidence that an information session was held;
 - k. signature of approval for live working (by a person in authority or by the owner).
- .7 If for the operational needs of the site occupants, the site representative requires the Contractor to perform energized work, the Contractor shall obtain all information necessary to complete an Energized Work Permit (method of work, arc level assessment, protective perimeter, protective equipment, etc.) and have it signed by the site representative designated by the Department Representative prior to the start of work.

1.23 EXPOSURE TO ASBESTOS

- .1 If the work covered by these specifications involves the handling of materials containing asbestos; or if the Contractor or the Department's Representative or his agent discovers materials that are likely to contain asbestos the Contractor shall immediately stop the work and notify the Department's Representative. If such materials are subsequently found to contain asbestos, the Contractor shall comply with the following requirements.

Prior to the commencement of any work that may emit asbestos dust, the Contractor shall:

- .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 Construction Work S-2.1, r-4*, and that addresses all requirements of
 - a. This same section.
- .2 Transmit certificates showing that all workers involved in the work have received training on asbestos-related risks and on the procedure required in the previous paragraph.
- .3 Demonstrate that he/she has on hand all the materials and equipment necessary to follow the procedure and to perform the work safely.

1.24 FUNGAL CONTAMINATION

- .1 It is not intended that the work covered by these specifications involve the handling of mold-contaminated materials; however, if the Contractor or the Department Representative or his designee discovers materials that are likely to be contaminated with mold, the Contractor shall immediately stop the work and notify the Department Representative. If such materials are subsequently shown to contain mold, the Contractor shall comply with the following requirements.

Prior to the commencement of any work for which workers are likely to come in contact with mold contaminated materials, the Contractor shall:

- 1. Provide a written work procedure that meets the requirements of the *Safety Code for the Construction Industry, S-2.1, r.4* as well as the requirements outlined in the *Canadian Construction Association's "Mould Guidelines for the Canadian Construction Industry"* (<http://www.cca-acc.com/documents/electronic/cca82/acc82.pdf>).
- 2. Demonstrate that he/she has on hand all the materials and equipment necessary to follow the procedure and to perform the work safely.

1.25 EXPOSURE TO SILICA

- .1 For any indoor or outdoor work generating silica dust, the Contractor shall comply with the following requirements, in addition to those of the *Safety Code for Construction Work S-2.1, r.4*.
1. Work in a wet environment or use tools with water to reduce dust, otherwise capture the dust at the source and retain it in a high efficiency filter to avoid spreading it in the environment.
 2. Clean surfaces and tools with water, never with compressed air.
 3. Sanding and stripping surfaces using an abrasive containing less than 1% silica (also called amorphous silica).
 4. Install screens or partitions to prevent dust from migrating out of the work area and protecting other workers and the public.
 5. Wear respiratory and eye protection equipment during all operations likely to produce silica dust in accordance with the requirements of the *Safety Code for Construction Work, S-2.1, r.4*.
 6. Wear protective clothing to prevent contamination off site.
 7. Do not eat, drink or smoke in a dusty area.
 8. Wash hands and face before drinking, eating or smoking.

1.26 ABRASIVE BLASTING

Prior to the start of any abrasive blasting work, the Contractor shall:

- .1 Provide a written work procedure that meets the requirements of Section 3.20 of the *Safety Code for Construction Work, S-2.1, r.4*.
- .2 Demonstrate that he/she has on hand all the materials and equipment necessary to follow the procedure and to perform the work safely.
- .3 All sanding and blasting work must be done with an abrasive containing less than 1% silica.

1.27 REMOVAL OF LEAD-BASED PAINT

Prior to the commencement of any work for which workers are likely to handle materials containing lead paint or other lead-containing substances, the Contractor shall:

- .1 Provide a written procedure that complies with the requirements of the *Safety Code for the Construction Industry, S-2.1, r.4* as well as the requirements outlined in the document "Guidelines for Lead Exposure on Construction Sites" published by the Ontario Ministry of Labour (http://www.labour.gov.on.ca/french/hs/pdf/gl_lead.pdf). In case of differences between the Quebec regulation and the Ontario document, the more stringent requirement applies.

Demonstrate that he/she has on hand all the materials and equipment necessary to follow the procedure and to perform the work safely.

1.28 RESPIRATORY PROTECTION

The Contractor shall ensure that all workers who are required to wear respirators as part of their duties have been trained and fit tested in accordance with CSA Standard Z94.4 *Selection, Care and Use of Respirators*. Certificates of fit testing shall be provided to the Departmental Representative upon request.

1.29 PREVENTION OF THE RISKS OF FALLS

- .1 Plan and organize work to eliminate fall hazards at the source or to provide collective protection, thereby minimizing the use of personal protective equipment. Where personal fall protection is required, workers shall use a safety harness in accordance with CAN - CSA- Z-259.10 - M90. A seat belt shall not be used as fall protection.
- .2 All persons operating a platform lift (scissor lift, telescopic mast, articulated mast, rotating mast, etc.) must be trained to do so.
- .3 Safety harnesses must be worn on all telescopic, articulated or rotating mast aerial work platforms.
- .4 Establish a hazard zone around each platform lift.
- .5 Any opening in a floor or roof shall be surrounded by a guardrail or covered by a cover attached to the floor and resistant to the loads to which it may be subjected, regardless of the size of the opening and the height of fall it represents.
- .6 Any person working within two metres of a fall hazard of three metres or more shall use a safety harness in accordance with the requirements of the regulations, unless a guardrail or other element providing equivalent safety is present.
- .7 Notwithstanding the requirements of the regulations, the Department Representative may require the installation of guardrails or the use of safety harnesses for specific situations where there is a risk of falls of less than 3 meters.

1.30 SCAFFOLDING

In addition to the requirements of the *Safety Code for Construction Work*, the Contractor using scaffolds shall comply with the following requirements:

Assizes

1. Scaffolds must be installed on solid bases so that they cannot slip or tip over.
2. The Contractor who wishes to install scaffolding on a roof, overhang, canopy or mansard shall submit to the Department Representative his load calculations and plans signed and sealed by an engineer and obtain his authorization before beginning the installation.

Assembly, bracing and mooring

- .1 All scaffolds shall be assembled, braced and secured in accordance with the manufacturer's instructions and the provisions of *the Safety Code for Construction Work*.
- .2 For any situation where it is necessary to remove certain elements of the scaffolding (e.g., braces), the Contractor shall submit to the Department's Representative, prior to the assembly of the scaffolding, an assembly procedure signed and sealed by an engineer certifying that the scaffolding thus assembled will allow the work to be performed safely, taking into account the loads that will be applied.

- .3 For any scaffold structure with a span between two supports greater than three metres, the Contractor shall provide the Department Representative with a signed and sealed assembly drawing by an engineer prior to assembly of the scaffold.

Protection against falls during assembly

- .1 At all times during assembly, all workers shall be protected from falls if they are exposed to a fall hazard of more than three metres.

Floors

1. Scaffold decks shall be designed and installed in accordance with the provisions of the *Construction Safety Code*.
2. If planks are used, they shall be approved and stamped in accordance with the provisions of Section 3.9.8 of the *Safety Code for Construction*.
3. Scaffolds of four or more sections (or six metres) in height must have a solid floor covering the entire surface of the bolts every three metres in height or fraction thereof, and the elements of these floors must not be moved at any time to create intermediate landings.

Guardrails

1. A guardrail must be installed at all working levels.
2. Bracing braces are not to be considered as guardrails.
3. If the floors are not solid, the guardrails must be installed just above the edge of the floor so that there is no horizontal gap between the floor and the guardrail.
4. For scaffolds four sections (or six metres) or more in height where solid floors are required, guardrails must be installed at each such landing at the start of the work and remain in place until the work is completed.

Means of access

1. The Contractor shall ensure that the means of access to the scaffold does not compromise the safety of the workers.
2. Where scaffold decks are made of planks, ladders must be installed so that protruding planks do not impede ascent or descent.
3. Notwithstanding the provisions of the *Safety Code for Construction*, stairs shall be installed on all scaffolds having six or more rows of uprights and six or more sections (or nine metres) in height.

Protection of the public and occupants

1. Where scaffolding is erected in an area accessible to the public, the Contractor shall take steps to prevent public access to the scaffolding and, where applicable, to the work or storage area in the vicinity of the scaffolding.
2. The Contractor shall install breezeways, netting or similar devices to protect workers, the public and occupants from falling objects. The means of protection selected shall be approved by the Department Representative.

Engineer's drawings

1. In addition to those required by the *Safety Code for construction work*, the Department Representative reserves the right to require engineering drawings for other types or configurations of scaffolds.
2. A plan signed and sealed by a professional engineer is required for any scaffold to which tarpaulins, covers or other devices that catch the wind will be attached.
3. A certificate of compliance signed by a professional engineer is required for all cases where an engineer's plan is required and before a person uses the facility that is the subject of the plan. A copy of these documents must be available at all times at the site.

1.31 ENCLOSED SPACES

In addition to complying with provincial confined space regulations, the Contractor shall comply with the requirements set out in the following paragraphs.

The Department Representative reserves the right, depending on the nature of the confined space hazards, the work to be performed, and/or the level of confined space expertise demonstrated by the Contractor, to require the Contractor to use the services of a firm specializing in health and safety or confined spaces to perform the confined space hazard analysis, to complete the entry permit, to perform the work supervision, or any other task related to confined space work.

Information on the enclosed spaces present on the site:

1. The following is a non-limiting list of confined spaces that the Contractor may be required to access during the course of this project:
2. The Contractor shall consider each of these confined spaces and shall also add to this list any new confined spaces that the Contractor may construct/install during the course of this project.

Person responsible for the health and safety of confined space work:

1. The Contractor shall designate a person responsible for the health and safety of the confined space work. This person shall be a qualified person as defined in section 297 of the *Regulation respecting occupational health and safety* (S-2.1, r.13). The qualified person shall be present at all times during the confined space work and shall ensure that all regulatory requirements and the requirements set out in this section are met. This includes completing and issuing the confined space entry permit.

Training

1. All persons having access to a confined space, as well as the person in charge and the confined space supervisor, must have completed confined space entry training.
2. All persons required to use self-contained breathing apparatus for confined space entry shall be trained in the use of such apparatus.
3. All persons identified as confined space rescuers shall have completed confined space rescue training.
4. Each of the training courses required in the preceding paragraphs shall be conducted by a firm specializing in health and safety or confined spaces.
5. Training certificates for the above listed individuals must be forwarded to the Department Representative prior to the start of confined space work.

Confined Space Risk Assessment

1. For each of the confined spaces listed at the beginning of this section, the Contractor shall obtain the necessary information from the site representative and conduct a hazard assessment for each of these confined spaces that relates to:

- a. the concentration of oxygen, flammable gases and vapors, combustible dusts that present a fire or explosion hazard, and the classes of contaminants generally likely to be present in or around the confined space;
- b. insufficient natural or mechanical ventilation;
- c. materials that may cause the worker to become entangled, buried or drown, such as sand, grain or liquid;
- d. to its interior configuration;
- e. pipes and ducts that enter the confined space;
- f. energy, such as electricity, moving mechanical parts, thermal stress, noise and water power;
- g. ignition sources such as open flames, lighting, welding and cutting, static electricity or sparks;
- h. any other special circumstances, such as the presence of vermin, rodents or insects.

These risk assessments must be done by the person responsible for the health and safety of the confined space work. They shall be forwarded to the Department Representative for analysis a minimum of 10 days prior to the scheduled confined space work and shall also contain the following information:

- a. location of the enclosed space;
- b. description of the enclosed space;
- c. dimensions of the enclosed space;
- d. number, location and size of openings;
- e. contents of the confined space (equipment, substances, etc.)
- f. date of the evaluation;
- g. name and signature of the person who conducted the assessment and the name of his/her employer.

The Contractor shall perform the same exercise for each of the enclosed spaces he will construct/install during the course of this project.

Confined Space Entry Permit

1. The Contractor shall forward to the Department Representative for review a minimum of 5 days prior to the scheduled confined space work a copy of each entry permit specific to the confined spaces to be entered. Entry permits shall be completed by the person responsible for the health and safety of the confined space work, and shall include at a minimum the following information:
 - a. description of the work to be performed and the method of work, including the equipment and tools required to perform the work;
 - b. description of the hazards and corresponding controls, based on the results of the confined space hazard assessment and the hazards of the work to be performed;
 - c. safety equipment that will be used to control confined space hazards (e.g., fan, gas detector, local exhaust, personal protective equipment, etc.);
 - d. rescue procedure containing at least the following elements:
 - i. means of communication between the confined space supervisor and workers within the confined space;
 - ii. rescue equipment specific to each confined space;
 - iii. Confirmation that the municipality's emergency response service has been notified of confined space work specifically on this site and can respond to a rescue within a confined space; otherwise, the contractor must identify site workers who will act as rescuers in the event that such rescuers are required to access the confined space (rescue training required);

- iv. location of the telephone and telephone number of the municipality's emergency response service (if applicable);
 - e. date of entry permit;
 - f. name of the person issuing the permit and the name of their employer;
 - g. name of supervisor and name of employer;
 - h. the names of the workers who are to enter the confined space and the name of the employer of each.
- 2. In cases where the site representative requires the use of their site specific confined space entry permit, the Contractor shall comply with the requirements of that permit.

Medical surveillance

- 1. The Contractor shall forward to the Department Representative a medical certificate dated within the last two years for all persons required to use an air-supplied respirator. This certificate shall confirm each person's fitness to use such equipment.
- 2. It is recommended that persons who are required to work in sewage collection systems or similar systems be vaccinated against diphtheria, tetanus and hepatitis "B".

Requirements during confined space work

- 1. Prior to each entry into a confined space, the person in charge shall take readings of the concentration of oxygen, flammable gases and any toxic gases that may be present and record the results of these readings on the previously required entry permit.
- 2. No worker may enter the confined space unless the following requirements are met:
 - a. the oxygen concentration must be greater than or equal to 19.5% and less than or equal to 23%;
 - b. the concentration of flammable gases or vapors must be less than or equal to 10% of the lower explosion limit;
 - c. the concentration of other gases shall not exceed the standards set out in Schedule I of the *Regulation respecting occupational health and safety* (S-2.1, r.13).
- 3. If the measured oxygen and gas concentrations are within the regulatory values, the responsible person must ensure that all preventive measures indicated on the permit are in place and must complete the entry permit (date, time, signatures, etc.) before issuing the permit and allowing access to the confined space.
- 4. An entry permit shall cover only one shift; the Contractor shall issue a new permit for each additional shift.
- 5. While working in the confined space, the gas concentration shall be continuously measured and the detector shall be installed at the workers' breathing zone. If conditions within the confined space are such that workers may not hear/see the detector alarm, the contractor shall find a way for the confined space monitor to monitor the concentration measurements while maintaining measurements at the workers' breathing zone.

6. If the work is arranged so that workers may be separated from each other in a large confined space, the Contractor shall provide additional gas detectors.
7. The Contractor shall provide gas detectors and maintain them in good condition. The Contractor shall be able to demonstrate that the gas detectors used have been calibrated and adjusted by the person in charge or by a qualified person and in accordance with the manufacturer's recommendations. At any time, the Department Representative may have the accuracy of the Contractor's equipment checked. In the event of a detection device failure, work shall immediately be suspended and all workers shall leave the confined space.
8. The gas detector manufacturer's manual should be available at the job site.
9. The Contractor shall provide a ventilation system of sufficient capacity to maintain contaminant concentrations below regulatory concentration limits.
10. If work generating airborne contaminants is performed (welding, use of products, etc.), the Contractor shall, if necessary, install a contaminant extraction system so as to comply with the regulatory air quality values at all times.
11. If a gas detector alarm is activated, all workers must exit the confined space. Concentration readings shall then be recorded on the entry permit. The Contractor shall then identify the source of the contamination, neutralize it, ventilate the confined space to remove residual contaminants, and allow access to the confined space only when oxygen and gas concentrations have returned to normal.
12. No compressed gas cylinders or welding machines should be brought inside confined spaces: these pieces of equipment should remain outside and should not block access or exit; all cylinders should be properly secured.
13. Electrical tools and equipment used for confined space work must be grounded and, where necessary, explosion-proof. All equipment shall be connected to a ground fault circuit interrupter or step-down transformer. The Contractor shall, at his own expense, have a qualified electrician modify any power outlets and/or circuit breakers he intends to use that do not meet these criteria.
14. If the confined space work requires hot work to be performed, the Contractor shall obtain a hot work permit and shall comply with the requirements for such permit.
15. The Contractor shall assign a competent person to perform the duties of a supervisor. The supervisor shall be assigned exclusively to these duties and shall remain outside the confined space at all times while a worker remains inside. In addition, he or she shall:
 - a. verify that the entry permit is completed, signed and posted next to the enclosed space;
 - b. Be familiar with the specific confined space work procedure and ensure that it is followed;
 - c. ensure constant communication with all workers in the confined space. ensure that the necessary emergency equipment is in place;
 - d. be familiar with the supplementary ventilation systems and ensure their proper operation for the duration of the work;
 - e. prevent access by unauthorized persons;
 - f. ensure that conditions in the area surrounding the confined space do not adversely affect the health and safety of workers inside the confined space.
 - g. trigger the emergency procedure if necessary.

16. The same person may perform the duties of supervisor and confined space health and safety person, provided that he or she can meet all the requirements of both duties.

1.32 EXCAVATION WORK

In addition to the requirements of the *Construction Safety Code*, the Contractor performing trenching or excavation work shall comply with the following requirements:

1. Complete the form below and submit it to the Departmental Representative prior to the commencement of excavation.
2. Forward to the Department Representative, as appropriate, the following documents:
 - a. plans and specifications, signed and sealed by a professional engineer, of the shoring to be installed for the excavation work; or
 - b. engineer's opinion specifying the angle of the trench walls or excavation.

Directive de creusage

N° _____ de _____

Cette directive de creusage est fournie à titre d'exemple par la Commission de la santé et de la sécurité du travail (CSST). On y trouve les principales indications que l'employeur devrait donner à la personne responsable des travaux sur le terrain et à l'opérateur de l'engin de terrassement.

Nom de l'entreprise	
Nom du projet	N° du projet
Adresse du chantier	Date du début des travaux

Repérage
Chainage ou axes : de _____ à _____ Plan annexé ☐ N° du plan : _____

Méthode de travail à utiliser
Tout en s'assurant que les parois ne présentent aucun danger de glissement de terrain,
☐ creuser et étançonner selon les plans et devis d'un ingénieur;
☐ creuser et étançonner en utilisant une boîte de tranchée;
☐ creuser sans étançonner pourvu que l'une des conditions suivantes soit respectée :
☐ le roc est sain;
☐ aucun travailleur ne descend dans la tranchée ou l'excavation;
☐ les parois sont creusées conformément à l'avis d'un ingénieur.

Dimensions du creusement (Creuser selon le profil suivant.)

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H Profondeur													
Lf Largeur au fond													
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Mesures de sécurité
Déposer les matériaux à une distance d'au moins 1,2 mètre (4 pi) du sommet des parois.
Ne laisser aucun véhicule s'approcher à moins de 3 mètres (10 pi) du sommet des parois.

- ☐ Respecter le plan de l'ingénieur concernant les travaux à proximité d'une construction existante.
- ☐ Suivre le plan de localisation pour repérer les infrastructures souterraines.
- ☐ Installer le matériel de signalisation prévu par le plan de circulation (barrières, repères visuels, etc.).
- ☐ Affecter un ou des signaleurs au contrôle de la circulation.
- ☐ Respecter la méthode prévue pour le travail à proximité des lignes électriques.
- ☐ Mettre en place les dispositifs de protection des travailleurs, par exemple les glissières de sécurité en béton.

Nom	Fonction	
Signature	Date	N° de téléphone

Directive remise
☐ au responsable des travaux sur le terrain ☐ à l'opérateur de l'engin de terrassement

(CCTH-588-2 (00140))

1.33

LIFTING LOADS WITH A CRANE OR A CRANE TRUCK

- .1 Unless otherwise specified, the Contractor shall prepare a lifting plan and submit it to the Departmental Representative for any lifting operation using a crane or truck crane at least 5 days prior to the commencement of the lifting operation covered by the plan. This lifting plan must contain at least the information listed at the end of this section.
- .2 The lifting plan shall be signed and sealed by a Professional Engineer for the following lifting operations
 - a. lifting of concrete panels;

- b. lifting mechanical/electrical equipment on a roof or on floors of a building;
 - c. lifting loads that encroach on a public road;
 - d. Lifting of large loads or heavy weights;
 - e. any other lifting operation as required by the Department Representative.
- .3 In addition to the above requirements, the Contractor shall plan lifting operations to prevent loads from passing over occupied areas on a site. Where it is not possible to do otherwise, the lifting plan shall be signed and sealed by a Professional Engineer and shall ensure the safety of the occupants of that area and shall be approved by the Departmental Representative. The Department Representative may, if deemed necessary, impose evening and weekend work.
- .4 The Contractor shall provide the Departmental Representative with a list of the lifting plans for the duration of the job as soon as the work begins. This list shall be updated as required if changes are made during the course of the work.
- .5 In addition to the mechanical inspection certificate, all cranes or truck cranes shall carry in the cab the annual inspection certificate and the crane logbook.
- .6 The entire lifting area shall be marked off to prevent unauthorized persons from entering.
- .7 The Contractor shall carefully inspect all slings and lifting accessories and ensure that those in poor condition are destroyed and discarded.
- .8 Lifting of compressed gas cylinders shall be done with a specially designed basket.

MINIMUM CONTENT OF A LIFTING PLAN

- Sketch showing at least the location of the crane, surrounding facilities, area covered by lifting operations, pedestrian and vehicle traffic routes, safety perimeter, etc.
- Weight of the loads.
- Dimensions of the loads.
- List of lifting accessories and weight of each.
- Total weight lifted.
- Maximum height of the obstacles to be overcome.
- Lifting height of the loads in relation to the roof surface (in case of lifting loads to be placed on roofs).
- Use of guide wires.
- Type of crane used.
- Crane capacity.
- Length of the arrow.
- Angle of the arrow.
- Range of action of the crane.
- Deployment of the stabilizers.

- Percentage of crane capacity utilization.
- Confirmation of verification of lifting equipment.
- Identification of the crane operator and the person in charge of lifting operations with signatures and date.

1.34 HOT WORK

Hot work refers to all work using an open flame or that can produce heat or sparks such as riveting, welding, cutting, brazing, grinding, burning, heating, etc.

- .1 At the beginning of each shift and for each area, the Contractor shall obtain a "Hot Work Permit" issued by the Site Manager.
- .2 A working portable fire extinguisher, adequate for the fire hazard, shall be available and readily accessible within 5m of any flame and source of sparks or intense heat.
- .3 The Contractor shall designate a person to provide continuous fire hazard monitoring for a minimum period of one (1) hour after the completion of each hot work. This person shall sign the section of the permit to this effect and submit it to the Site Manager after the one hour period.
- .4 Where hot work is performed in areas where combustible materials are present or where walls, ceilings or floors are made of or covered with combustible materials, a final inspection of the work area shall be scheduled four (4) hours after completion of the work. Unless otherwise directed by the Department Representative, the Contractor shall designate a person to perform this supervision.

Welding and cutting

In addition to the requirements set forth in the preceding paragraphs, the Contractor shall meet the following requirements:

1. Welding and cutting work shall be performed in accordance with the requirements of the *Safety Code for Construction Work, S-2.1, r.4* and *CSA Standard W117.2 Safety in Welding, Cutting and Allied Processes*.
2. Use an air extraction system with filters for any welding or cutting work done indoors.
3. Discontinue any activity that produces flammable or combustible gases, vapors or dusts in the vicinity of welding or cutting operations.
4. Store compressed gas cylinders on a fireproof surface and ensure that the room is well ventilated.
5. Store all oxygen cylinders at least 6 meters away from flammable gas cylinders (e.g. acetylene) or combustible material such as oil or grease, unless they are separated by a partition made of non-combustible material as specified in section 3.13.4. of the *Safety Code for the Construction Industry, S-2.1, r.4*.
6. Store cylinders away from heat sources.
7. Do not store cylinders near stairs, exits, hallways and elevators.
8. Do not bring acetylene into contact with metals such as silver, mercury, copper and brass alloys with more than 65% copper, to avoid the risk of an explosive reaction.
9. Check that the arc welding equipment has the required voltage and is grounded.
10. Make sure that the electric welding equipment leads are not damaged.
11. Place the welding equipment on flat ground protected from the weather

12. Use flame retardant blankets when welding work is done in overlapping areas where there is a risk of sparks falling.
13. Keep flammable or combustible materials away or protected within 50 feet of the welding operation.
14. Never weld or cut on a closed container.
15. Do not cut, weld, or perform any open flame work on containers, tanks, pipes, or other receptacles that have contained a flammable or explosive substance or residue unless:
 - a. they have been cleaned and air samples taken indicating the absence of explosive vapors; and
 - b. provisions have been made to ensure the safety of workers.

1.35 ROOFING WORK

Protection against falls from height

1. The installation of guardrails is mandatory at all times; however, the installation of a warning line is permitted to delineate work areas provided all requirements of Sections 2.9.4.0 and 2.9.4.1 of the *Safety Code for Construction Work* are met.
2. The guardrails must remain in place until the project is completed. The Departmental Representative will authorize their removal when he/she can confirm that all required work, inspections and corrections have been completed.
3. A safety harness must be worn when installing guardrails.
4. The wearing of a safety harness is mandatory for the installation and modification of parapets or flashings, if it is necessary to temporarily move the guardrails.
5. The wearing of a safety harness is mandatory for the reception of material and the signals to the crane at the edge of the void.
6. The wearing of a safety harness is mandatory for all work at the edge of the void where collective protection does not offer adequate safety.
7. The Contractor shall provide a method of attachment and emergency cable system in accordance with Section 2.10.12 of the *Safety Code for the Construction Industry (R.S.Q., S-2.1, r.4)* for each different area or work location.

Lifting of materials

1. For all winch installations, the contractor shall submit to the Department Representative the manufacturer's recommended installation procedure or, in the absence thereof, an installation procedure signed and sealed by a professional engineer. The installation procedure shall include consideration of maximum allowable loads, number, weight and location of counterweights and any other details that may affect the capacity and stability of the device.
2. The Contractor shall carefully inspect all slings and lifting accessories and ensure that those in poor condition are destroyed and discarded.
3. The lifting of compressed gas cylinders must be done with a specially designed basket.
4. For any use of a crane or truck crane, the Contractor shall comply with the requirements of the "Lifting of Loads by Crane or Truck Crane" paragraph of this section.

Protection against burns

1. Hot water bottle workers must wear long sleeves and safety glasses and a face shield when loading the hot water bottle.
2. Persons working with asphalt or other hot liquids must wear gloves, long sleeves and safety glasses.

Protection against fire

1. Storage and use of propane cylinders shall be in accordance with *CAN/CSA-B149.2 Propane Storage and Handling Code*. Cylinders shall be stored outdoors in a secure area, free from unauthorized handling, in an area where there is no movement of vehicles or equipment unless protected by barriers or equivalent protection.
2. The amount of propane cylinders on the roof shall not exceed that required for one day's work and the cylinders shall be secured upright or held vertically in a cart designed for that purpose at all times.
3. All hot work (burning, heating, riveting, welding, cutting, grinding, etc.) shall be performed in accordance with the "Hot Work" paragraph of this section.

Materials and waste management

1. On the roof, light and sheet materials shall be kept in containers or securely tied. In the event of a variance, the Department Representative may prohibit the storage of materials on the roof.
2. Waste shall be disposed of as it is received by a waste chute or in suitable containers; the Contractor shall provide means to prevent waste from blowing away.
3. All waste materials must be removed from the roof at the end of each shift.
4. Unless specifically authorized by the Departmental Representative, all dumpsters shall be placed at least 10 feet from any structure or building.

Protection of occupants and the public

1. The Contractor shall install walkways, netting, or other devices to protect workers, the public, and occupants from falling objects from building accesses and exits. The selected means of protection shall be approved by the Department Representative.
2. A ground safety perimeter shall be established under the work area to protect workers, the public and occupants.
3. The groundwork area, the material handling area, and the area where the hot water bottle is installed must be clearly barricaded so that occupants and the public cannot access it.
4. Before installing any equipment that may emit gases or vapors, the Contractor shall obtain authorization from the site manager. The site manager shall ensure that there is no risk of infiltration into the building's ventilation systems.

1.36 ASSEMBLY OR DISASSEMBLY OF STEEL STRUCTURES

- .1 In addition to complying with Section 3.24 of the *Safety Code for the Construction Industry* (S-2.1, r.4), the Contractor shall comply with the requirements set forth in the following paragraphs.
- .2 The Contractor shall forward the following documents to the Department Representative prior to the start of structural steel erection work:
 - .1 assembly procedure in accordance with section 3.24.10 of the *Safety Code for the Construction Industry* (S-2.1, r.4);
 - .2 a rescue procedure for the release of a worker suspended in a safety harness within 15 minutes, adapted to the work site and in accordance with section 3.24.4 of the same code; this procedure must be accompanied by written confirmation that it has been tested;

- .3 Engineer's certificate that the anchor rods have been installed in accordance with the anchoring plan, as required by Section 3.24.12 of this Code;
 - .4 lifting procedure, where the lifting is done in one of the ways specified in Section 3.24.15 of this Code;
 - .5 name of the person identified as the rescuer and that person's certification of rescue training;
 - .6 name of the person identified as the first aider and that person's first aid training certificate;
- .3 The Contractor shall ensure that the following documents are available at all times on the job site for review:
- .1 Structural steel manufacturer's erection drawing that complies with the requirements of Section 3.24.9 of the *Safety Code for Construction* (S-2.1, r.4);
 - .2 Anchoring plan for the anchor rods of the poles in accordance with the requirements of section 3.24.11 of the *Safety Code for Construction Work* (S-2.1, r.4);

1.37 WORK NEAR A WATER BODY

1. For all work performed near a body of water (including overwater work, work on a dock, work along a watercourse, etc.), the Contractor shall comply with the requirements of the following paragraphs in addition to complying with section 2.10.13 of the *Safety Code for Construction Work*.
2. The Contractor shall plan his work so that safety measures are in place to prevent any worker from falling into the water. The use of these safety measures shall be preferred to the wearing of life jackets.
3. Ensure that workers wear a life jacket that can keep the wearer's head out of the water and float effortlessly with the arms if no other safety measures can protect them.
4. Submit the following documents to the Department's Representative prior to the start of work:
 - a. description of the water body;
 - b. description of the work carried out in the vicinity of this water body;
 - c. on-water transportation plan adapted to the work and the characteristics of the water body;
 - d. rescue plan adapted to the work and the characteristics of the water body;

Each of the documents listed above shall contain, at a minimum, the information required in Section 11 of the *Safety Code for Construction Work*.

If it is possible that all or part of the work will take place during the winter months, the safety measures included in the above required documents must be adapted accordingly.

5. The Contractor shall forward to the Department Representative the training certification required by Section 11.2 of the *Construction Safety Code* for the following individuals:
 - a. the person designated to prepare the documents required by the preceding paragraph; and
 - b. each person responsible for transport or rescue operations.

6. If the rescue plan calls for the use of a boat, the Contractor shall provide the Departmental Representative with the Transport Canada Rescue Responder Card or Certificate of Competency for his work.
7. The Contractor shall include in his weekly inspection schedule the devices required in Sections 11.4 and 11.5 of the *Safety Code for Construction*.
8. Ensure that a lifeboat, moored and in the water, is available at each location where a worker may fall into the water. However, a boat may serve multiple locations on the same site provided that the distance between each of these locations and the boat is less than 30 m.
9. Where the work area is a pier, dock, wharf or other similar structure, a ladder with at least two (2) rungs below the surface of the water shall be installed at the front of the structure every 60 m.

1.38 TEMPORARY HEATING

1. In addition to complying with Section 3.11 of the *Safety Code for the Construction Industry* (S-2.1, r.4), the Contractor shall comply with the requirements set forth in the following paragraphs.
2. A portable fire extinguisher must be available at all times in the vicinity of heating appliances, regardless of the type of heating used.
3. The devices must always be used according to the manufacturer's specifications.
4. Where applicable, tarpaulins and covers used in the vicinity of heating appliances must be securely fastened to prevent them from being thrown onto the appliances, the piping connected to the appliances or any other heat source.
5. Gas cylinders shall be installed in such a manner as to be protected from vehicular traffic and other equipment.
6. For any use of heating appliances other than electric, the Contractor shall install a carbon monoxide detector in the work area, in close proximity to the appliances and/or workers, for the duration of the heating period. The Contractor shall immediately make the necessary corrections to the heating installations if the detector alarm sounds.
7. The Contractor shall provide minimal monitoring of the heaters during non-working hours (evenings and weekends). The Contractor shall submit a monitoring plan to the Departmental Representative prior to the use of the heaters.

1.39 WORK NEAR OVERHEAD POWER LINES

1. Where there is an overhead power line in the work area and the Contractor elects to apply paragraph (b) of section 5.2.2 of the *Safety Code for Construction* (2.1, r.4), a copy of the agreement with the electrical operating company and a copy of the work procedure, required in section 5.2.2 (b), shall be forwarded to the Department Representative prior to the commencement of work in connection with these documents.

1.40 H&S SUBORDINATION AGREEMENT

Project: _____ **Address:** _____

OUTSIDE CONTRACTOR

I hereby undertake to submit to the authority of (name of the prime contractor) _____, who is the prime contractor for the above-mentioned project, for the duration of our work on the site. Therefore, I confirm that I have read the prevention program of the prime contractor and I agree to :

- inform my employees of the content of the contractor's prevention program and ensure that its content is respected at all times;
- provide the specific prevention program for our activities under this project
- to inform the project manager of my interventions on the site and to obtain his agreement before proceeding with the work;
- Follow the health and safety instructions given by the prime contractor's representative on the job site and attend training activities and health and safety meetings as required.

Name of representative: _____

Company Name: _____

Description of work to be done on site: _____

Approximate dates of work (start-finish) : _____

Signature: _____ Date: _____

PROJECT MANAGER

I hereby agree to allow (name of outside contractor) _____ to perform work on the above-noted project and, as the prime contractor, to take the necessary steps to protect the health and safety of the workers on site. In the event that the contractor repeatedly refuses or fails to comply with my instructions, I undertake to inform the PWGSC departmental representative and to provide documentary evidence of my interventions with the contractor.

Name of representative: _____

Name of the main contractor: _____

Signature: _____ Date: _____

Submit the completed and signed copy to the PWGSC departmental representative

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 ENVIRONMENTAL ASSESSMENT

- .1 If an Environmental Assessment (EA) is attached to this project, the Trade Contractor shall consult the EA and implement all mitigation measures prescribed for each activity.

1.3 DEFINITIONS

- .1 Pollution and damage to the environment: the presence of chemical, physical or biological elements or agents that have a harmful effect on human health and well-being, that alter the ecological balance important to humans and that constitute an attack on species that play an important role for them or that degrade the aesthetic, cultural or historical characteristics of the environment.
- .2 Environmental protection: prevention/control of pollution and disruption of habitat and the environment during construction. Prevention of pollution and environmental damage covers protection of soil, water, air, biological and cultural resources; it also includes management of visual aesthetics, noise, solid, chemical, gaseous and liquid waste.

1.4 FIRE

- .1 Fires and burning of waste on Department property are not permitted.
- .2 Take the necessary measures to ensure the surveillance and protection against fires.

1.5 WASTE DISPOSAL

- .1 Comply with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 The burial of waste and scrap materials is prohibited within the Department.
- .3 The disposal of waste materials or volatile materials such as mineral spirits and oil or paint thinners into waterways, storm drains or sanitary sewers is prohibited.
- .4 Residual materials shall be disposed of off departmental property while complying with federal and provincial environmental protection regulations. Residual materials also include demolition materials not retained by the Department, hazardous materials (liquid and solid) and water containing suspended solids.

1.6 POLLUTION PREVENTION

- .1 Ensure control of off-gassing from equipment and facilities in accordance with federal, provincial and municipal requirements.
- .2 Dampen dry materials and cover waste to prevent wind from kicking up dust or blowing away debris.

- .3 The Contractor shall be held responsible for any spill of material deemed harmful to the environment or Department property and if so, the Contractor shall immediately perform, at the Contractor's expense, such remedial action as may be directed by the Department Representative.
- .4 Maintain temporary pollution prevention facilities.
- .5 All temporary or mobile hydrocarbon storage facilities shall comply with all applicable standards and laws.

1.7 PROTECTION OF WORKS

- .1 Take necessary procedures to protect the building structure, its facilities and adjacent properties.

1.8 CLEARING OF THE SITE AND PROTECTION OF TREES, SHRUBS AND PLANTS

- .1 The protection of trees, shrubs and plants applies to those not directly under the footprint of the structures planned for construction.
- .2 Ensure the protection of trees, shrubs and plants on the work site and adjacent properties. Any planting deemed by the Department Representative to be sufficiently damaged by the Contractor, to question the ability of the plant to survive, shall be replaced by the Contractor at the rate of two equivalent plantings for each damaged plant.
- .3 The Contractor shall obtain approval from the Departmental Representative to perform the pruning. The Contractor shall apply a product approved by the Departmental Representative to the wound uncovered by the selective cutting of branches.
- .4 Where there is a few meters of latitude around the tree, install 1.2 m high construction fencing at a distance of 1.0 m from the tree trunk. This high density polyethylene fence (35 kN tensile strength), orange in color, should be attached to steel stakes, spaced no more than 2.0 m apart.
- .5 If a reasonable distance can't be maintained around the tree, as a last resort, opt for protection placed directly on the trunk. This protection will consist of placing 1.8 m high planks around the trunk. The planks will rest on two rubber bands and will be held in place with two plastic or steel bands.
- .6 Exhaust components from motor vehicles can cause serious damage to trees. It is therefore recommended to shut down the engine of stopped vehicles or to direct the exhaust in the opposite direction of the trees.
- .7 For required traffic areas within 3 m of a tree, spread a temporary layer of non-compacting material (e.g. wood chips) 300 mm thick over an air and water permeable geotextile membrane.
- .8 When it is necessary to excavate within the optimum protection zone, pre-cut the roots to avoid lifting or tearing the roots. The depth of this pre-cut should be 500 mm.
- .9 During excavation and grading, protect the roots of designated trees to the drip line so that they are not displaced or damaged. Avoid unnecessary traffic and unloading or storage of materials over protected tree root zones.
- .10 Watering of protected trees and shrubs must be done during the summer season after a period without rain of 10 consecutive days. The watering period may be reduced during heat waves.
- .11 Minimize removal of topsoil and vegetation.
- .12 Remove trees only in areas designated by the Department Representative.

- .13 In the event that plantings need to be moved, place them in a burlap bag with the root ball. Keep the root ball moist at all times. Replant once the work is completed at the original location.

1.9 DRAINING

- .1 Provide temporary drainage and pumping, necessary to keep the excavations and work site dry. The Contractor shall obtain prior approval from the Departmental Representative for the location of the planned discharge point.
- .2 No person shall discharge water containing sediment or suspended solids into watercourses, sewer systems or drainage systems without appropriate filtration.
- .3 Control the discharge of water containing sediment or suspended solids or any hazardous materials in accordance with local authority requirements. In particular, it will be required to install compliant sediment barriers at the outfall of drainage water to the various existing watercourses or drainage ditches.

1.10 WORK PERFORMED IN AND/OR NEAR WATERCOURSES

- .1 The removal of any natural material from or near the bed of any watercourse is prohibited.
- .2 It is prohibited to introduce any type of waste or material into or near waterways.
- .3 The Contractor shall take the necessary measures to minimize the suspension of material through the mixing of the streambed.
- .4 Design and construct temporary stream crossings to minimize erosion problems.
- .5 Do not cross logs or construction materials from one bank to the other using the watercourse.
- .6 Blasting underwater or within 100 m of spawning grounds or other sensitive habitats is prohibited.

1.11 SEEPAGE WATER MANAGEMENT

- .1 Water accumulating in the excavations may need to be pumped and removed from the site in accordance with applicable regulations and guidelines. If pumping is required, the following tasks should be performed by the Contractor:
 - .1 Samples of water accumulated in the excavation for analysis of their concentrations in HP(C10-C50), PAHs, MAHs and basic heavy metals (24-hour turnaround);
- .2 Depending on the results of the analysis, the Excavation Contractor shall perform:
 - .1 Pumping with a vacuum tanker and disposal of the collected water to an authorized treatment center;
 - .2 Pumping of water and discharge into the natural water system or the municipal sewer system. Before discharging the pumped water, the Contractor shall ensure that the requirements of the municipal regulations are met. If required, the Contractor shall filter the pumped water before discharge.
 - .3 The infiltration water management method selected by the Contractor shall be approved by the Department Representative.

1.12 AIR POLLUTION PREVENTION

- .1 Maintain temporary facilities established under this contract to prevent erosion and pollution.

- .2 Control of fumes from materials, equipment, vehicles and facilities shall be provided by the Contractor in accordance with local, federal, state and municipal requirements.
- .3 Idling" of vehicles is prohibited, unless special permission is granted by the Department Representative.
- .4 Construct temporary shelters to prevent blasting materials and other foreign matter from contaminating the air beyond the application area.
- .5 Water down dry materials and cover waste to prevent wind from kicking up dust or blowing debris away. Suppress dust on temporary roads.

1.13 OIL SPILL

- .1 The Contractor and his subcontractors who perform work requiring the use of motorized equipment, fuel transfer, or using hazardous materials are hereby affected. They shall be made aware of the procedures to be followed in the event of an oil spill. This procedure shall be posted in full view of employees at the work site.
- .2 The Contractor shall ensure that the machinery, plant and equipment to be used in the performance of the work is safe, clean and in good working order. The Departmental Representative reserves the right to refuse access to or remove from the work site any machinery, plant and equipment that does not meet this compliance. Visibly poorly maintained equipment with evidence of leaks or potential for leaks will be returned from the job site at the Contractor's or equipment owner's expense at no cost to the Department Representative.
- .3 The Contractor shall have an emergency response kit on the work site to respond to environmental response events.
- .4 This response kit shall include, but not be limited to, a minimum of equipment and devices appropriate to contain any spill in order to minimize the risk of spreading contamination caused by a spill of hydrocarbons, hazardous materials or other contaminants. This response kit identified as EMERGENCY - ENVIRONMENT shall contain:
 - .1 One 3 inch diameter absorbent pad, length 12 feet
 - .2 One 3 inch diameter absorbent pad, 4 feet long
 - .3 25 absorbent layers (diapers)
 - .4 2 bags of 7 liter absorbent (Sphagnum moss type)
 - .5 A stick of epoxy
 - .6 2 DANGER posters
 - .7 3 plastic recovery bags
 - .8 Self-adhesive labels TDG class 4.1
 - .9 1 permanent marker pen
 - .10 2 pairs of rubber gloves
 - .11 2 pairs of safety glasses
 - .12 Duct Tape" type adhesive tape
 - .13 Some tools: cutting pliers and screwdriver
 - .14 Environmental Incident Report Forms.

- .5 If the Contractor is required to store hazardous materials and hydrocarbons, for the purposes of the project, the Contractor shall have storage bins on the storage site.

1.14 PROCEDURE IN THE EVENT OF A SPILL OF HYDROCARBONS, HAZARDOUS MATERIALS OR OTHER CONTAMINANTS

- .1 In the event of an oil spill, response and cleanup operations at the spill site shall be performed by the Contractor according to the following procedure:
 - .1 Ensure the safety of people and recover the spill immediately.
 - .2 If the Contractor is unable to immediately contain or recover the spill or if the spill occurs in water, notify :
 - .1 A specialized decontamination service.
 - .3 The Contractor shall thereafter immediately report the spill (regardless of quantity) to the Department Representative and prepare and submit to the Department Representative, the response report.
 - .4 If the Department is unable to respond adequately and to its satisfaction due to the size or type of spill, the costs of additional interventions requiring the Department's personnel or machinery shall be borne by the Contractor.
 - .5 Incident Report: In the event of an incident, the Contractor shall complete the incident report form (Environmental Incident Report) without delay and submit it to the contract coordinator. This document will be given at the preliminary meeting before the beginning of the work.

1.15 TEMPORARY STORAGE OF HAZARDOUS MATERIALS

- .1 Hazardous products must be grouped in islands separated by a horizontal distance of 1 m. Incompatible products are separated by a horizontal distance of 3 m. The islands are located at least 30 m from the tree/shrub line and at least 6 m from an area covered by herbaceous/grass plants. Safety distances are maintained (30 m from watercourses, 15 m from tents and 3 m from combustible material and roads). Access is provided for emergency responders.
- .2 Mobile tanks meet highway standards. When transferring fuel, ground the vehicle being fueled and the fueler by connecting the grounding cable from the vehicle being fueled to the tanker and ensuring that contact is made to bare metal.
- .3 Storage areas are equipped with a liquid retention or collection system (Polyspill pallets, troughs, impermeable liners, speed bumps, trenches, blocked drains or connected to a recovery system). Rainwater is regularly drained or the storage area is protected to prevent rainwater accumulation. Runoff water, fire fighting water can be captured before being introduced into waterways, groundwater or sewers.
- .4 Containers of flammable and combustible liquids are stored in an upright position.
- .5 Containers in poor condition must be disposed of immediately off-site, in accordance with the most restrictive environmental standards. Containers must be identified according to WHMIS.
- .6 Temporary storage of hazardous materials will be required to indicate the risks with TDG (Transportation of Dangerous Goods) placards.

1.16 MANAGEMENT OF EXISTING OR CONTAMINATED SOILS

- .1 Soils that do not meet criterion "B" of the MDDEFP Soil Protection and Contaminated Sites Remediation Policy ("Policy") or criterion "Commercial" of the Canadian Council of Ministers of the Environment ("CCME") Canadian Environmental Quality Guidelines will have to be excavated by the Specialized Contractor. These soils will come from areas already characterized and identified as having potential concentrations of HP(F1-F4), PAHs, MAHs, dioxins and furans or metals (Cd, Cr, Cu, Ni, Pb, Zn) exceeding the above mentioned criteria.
- .2 Materials temporarily stored on the excavation site shall be placed on an impermeable membrane and covered at the end of each day of operation. The impermeable membrane must have a sufficient surface area to cover all the excavated materials that are stored. It must be provided with ballast essential for its fixation. The membrane must be maintained in an adequate condition for its intended use.
- .3 The location of the pile shall be determined in consultation with the Departmental Representative. It shall not be located within 30 m of any watercourse or any sanitary or storm sewer and shall leave all traffic lanes clear. The soils in this pile shall be sampled by a specialized environmental firm and analyzed by an accredited laboratory. The analytical results will determine the final management of the soils. Allow approximately one week for the results of the analysis to be available.
- .4 Following receipt of the test results, the Contractor may arrange for the contaminated soil to be transported to an authorized site for disposal.
- .5 Wait for authorization from the Department Representative before using the backfill. Excavated soils shall be reused for backfill of the excavation unless visual or olfactory evidence of residue/debris/waste or contamination is observed or confirmed upon analysis.
- .6 The work shall be performed at all times so as not to spread contaminated soils onto uncontaminated surfaces on or off site. Any contamination resulting from operations related to the excavation and transportation of contaminated soils or due to negligence of the Contractor shall be corrected at the Contractor's expense.
- .7 The Contractor shall compile transportation manifests and weigh tickets during the disposal of contaminated soils to the permitted site and provide a copy of these to the Department Representative.
- .8 In the event of the excavation of residual materials (dangerous or not) (metal, wood, slag, electrical wires, brick, cement concrete, bituminous concrete, tiles, glass, etc.), these materials must be managed according to the regulations in force and cannot be buried on the work site (Regulation on dangerous materials and Regulation on the burial and incineration of residual materials of the Environment Quality Act)

1.17 NOISE POLLUTION

- .1 As the project will be located in a residential area, the following precautions should be taken:
 - .1 Use equipment that is in good working order, complies with emission regulations, has a functional muffler and is free of oil leaks.
 - .2 Suspend work requiring the use of particularly noisy equipment on Sundays, holidays, and evenings and nights from 10:00 p.m. to 7:00 a.m.
 - .3 Avoid idling engines when not required.

1.18 LIGHT POLLUTION

- .1 Lighting of the work site shall not be a nuisance to neighbouring residences. The lighting must be in conformity with article 19 of the R.V.Q. 1006, of the City of Quebec, which stipulates that " Constitutes a nuisance a luminous device placed on a building, a construction or on the ground, the intensity and orientation of which are of such a nature as to inconvenience the neighbourhood.

1.19 AIR POLLUTION

- .1 Shut down equipment, tools and machinery when not in use, unless extreme temperature conditions require continuous operation.

1.20 MACHINERY MAINTENANCE

- .1 Do not service motorized equipment on site.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

- .1 Not applicable.

END OF SECTION

PARTIE 1 GENERAL

1.1 INSPECTION

- .1 The Departmental Representative shall have access to the works. If any part of the work or structures is performed off-site, access to that area shall also be provided to the Departmental Representative throughout the duration of the work.
- .2 Where special inspections, approvals or tests of the Work are required by the Department's Representative or by local regulations governing the site, request them within a reasonable time.
- .3 If the Contractor has covered or allowed to be covered any work before it has been subjected to the required inspections, approvals or special tests, the Contractor shall uncover the work in question, see that the required inspections or tests are performed to the satisfaction of the authorities having jurisdiction, and then restore the work to its original condition.
- .4 The Department Representative may order an inspection of any portion of the Work where compliance with the Contract Documents is in doubt. If, upon examination, the work in question is found not to conform to the requirements of the Contract Documents, the Contractor shall take such action as is necessary to bring the work into conformity with the specified requirements, and shall bear the cost of inspection and repair.

1.2 INSPECTION AND TESTING

- .1 The Contractor shall be responsible for quality control, and shall retain and pay for:
 - .1 Inspections and/or tests required by laws, ordinances, rules, regulations or at the direction of public authorities.
 - .2 Inspections and/or tests performed exclusively for the convenience of the Contractor. All testing will be paid for by the Contractor if shown to be in default.
 - .3 Adjustment and balancing of transport systems, equipment and mechanical and electrical systems.
 - .4 Tests and certificates of compliance with the requirements of the specification.
 - .5 The specified tests to be performed by the Contractor as part of commissioning procedures.
 - .6 Additional testing as noted elsewhere in individual sections of the specification.
- .2 The Department Representative may retain the services of independent testing and inspection agencies. The cost of such services shall be borne by the Department Representative.
 - .1 The use of testing and inspection agencies does not relieve the Contractor of responsibility for the performance of the work in accordance with the requirements of the Contract Documents.
 - .2 If defects are found during testing and/or inspection, the designated agency will require further inspection and/or additional testing to accurately define the nature and extent of such defects. The Contractor shall correct the defects and imperfections as directed by the Department Representative, at no additional cost to the Department Representative, and shall be responsible for the cost of testing and inspection to be performed after such corrections.

1.3 SERVICE TO BE RENDERED FOR THE INDEPENDENT TESTING LABORATORY (N/A)

- .1 Laboratory presence on site:
 - .1 The Laboratory shall ensure the presence on site of competent personnel as well as the supply of equipment necessary to perform quality control and certain measurements during the construction of civil, structural and architectural works.
 - .2 Supervision work on site for quality control and measurements must be carried out by competent technicians or specialized engineers.
 - .3 The Laboratory shall provide a permanent presence at the site, including during the following work:
 - .1 Excavation and soil management;
 - .2 Compaction;
 - .3 All concrete pours;
- .2 Laboratory testing:
 - .1 The laboratory shall perform the following laboratory tests:
 - .1 Subfoundation MG-56 or MG-112
 - .2 MG-20 Foundation, CG-14 Pipe Cover and Cushion
 - .3 Concrete for civil engineering (sidewalks, islands, curbs, exterior slabs)
 - .4 Concrete for Structure (foundations and slabs on ground)
 - .5 Chemical analysis (contaminated soils)
 - .6 Reinforcing steel
 - .2 All laboratory test reports must be validated and signed by an engineer who is a member of the Ordre des ingénieurs du Québec.
- .3 Earthworks :
 - .1 Instruct the Contractor in the sorting, storage and processing, if required, of excavated material for reuse as backfill.
 - .2 Verify and approve the materials used for the backfill work.
 - .3 Check and approve the compactness of the natural soil, the bottom of the excavations and each layer of backfill material.
 - .4 Instruct the Contractor regarding the removal of material unsuitable for construction below the subgrade line (heterogeneous fill, scrap, contaminated soils, etc.).
- .4 Management of contaminated soils:
 - .1 Although Englobe's environmental soil survey (Appendix B) did not find any contaminated soils, the following is only if this were to occur.
 - .2 Plan, adapt and supervise the excavation and sampling sequence in situ in order to minimize the overall costs related to the management of contaminated soils. Sampling, analysis and reporting are performed by the Laboratory.
 - .3 Instruct and supervise the Contractor regarding the excavation and management of contaminated soil and water in accordance with municipal regulations and the requirements of the Soil Protection and Rehabilitation Policy for Contaminated Sites of the Ministère du Développement durable, de l'Environnement et des Parcs du Québec (MDDEP).

- .4 Perform joint measurement with the Contractor of the quantities of contaminated soils in excess of Criterion C transported off-site for disposal at permitted locations and compile weigh-out coupons for payment.
- .5 Delineate and survey contaminated soil excavation areas, take photographs of work, compile truck weight coupons, and approve and record truck destination for all soils disposed of off-site.
- .5 Produce, at the end of the work, a site decontamination report containing all the information required for certification by a certified expert accredited by the Ministère du Développement durable, de l'Environnement et des Parcs du Québec (MDDEP) and following the requirements of section IV.2.1 of the Environment Quality Act. The Laboratory shall perform all activities not explicitly described here, but required for the production of this report.
- .6 Undergrounding of sewer and water mains :
 - .1 Verify and approve granular materials used for cushioning and pipe embedment.
 - .2 Verify and approve the thickness and compactness of the bedding and encasement of pipes and structures - manholes, sumps, etc.
 - .3 Verify and approve trench backfill materials including placement and compactness.
- .7 Sub-base and foundation in granular materials for roadways and building foundations:
 - .1 Verify and approve certificates of compliance for materials submitted by the Contractor.
 - .2 Check and approve the thickness and compactness of each layer of granular material before placing the next layer.
 - .3 Verify and approve the Contractor's method of placing and compacting the backfill.
 - .4 Approve and verify methods of protecting and stockpiling spoil for future reuse under the slab-on-grade.
- .8 Concrete for sidewalks, curbs and exterior slabs:
 - .1 Verify and approve concrete batching formulas and test results provided by the Contractor. Applicable to each concrete delivery (truck).
 - .2 Verify and approve materials, thickness and compactness of the base of concrete structures.
 - .3 Check the installation of the reinforcement and the anchors before the concrete is poured.
 - .4 Control the loads of concrete delivered to the site. Check the class of the concrete.
 - .5 Check the addition of superplasticizer, water and admixture to the site. Check the air content and the homogeneity of the concrete. Check delivery times, unloading and waiting times. Perform on-site slump tests. The Laboratory shall refuse to unload concrete deliveries that do not meet the specifications.
 - .6 Check the execution of shrinkage, expansion and insulation joints and aesthetic joints.
- .9 Excavation for buildings
 - .1 Check and approve the compactness of the natural soil of the excavation bottom before each concrete pour of the footings or invert.
 - .2 Verify and approve the excavation slopes determined in the geotechnical study.
- .10 Concrete for building foundations and slabs on ground:

- .1 Verify and approve concrete batching formulas and test results provided by the Contractor.
- .2 Control the loads of concrete delivered to the site. Check the class of concrete. Check the addition of super plasticizer, water and admixture to the site. Check the air content and the homogeneity of the concrete. Check delivery times, unloading and waiting times. Perform on-site slump tests. The laboratory shall refuse unloading of concrete deliveries that do not meet the specification criteria. Applicable to each concrete delivery (truck).
- .3 Check the verticality and squareness of the formwork elements of the jack pits before pouring the concrete.
- .4 Check the flatness of the slabs on the ground according to the prescription on the plans and specifications.
- .5 Perform sampling and flexural tests for concrete with fibers.
- .6 Approve the source of the reinforcing steel and test samples of each size of reinforcing bar to be taken and analyzed in the laboratory. Mechanical and chemical properties shall be in accordance with CSA G30.18-09.
- .7 Perform compressive strength tests:
 - .1 3 cylinders for the first 50 cubic meters or for each smaller pour.
 - .2 3 cylinders for every next 100 cubic meters or 3 cylinders minimum.
- .11 Steel structures :
 - .1 Check the source of the structural steel.
 - .2 Verify and approve the welding methods of structural steel materials at the factory and at the job site (if required) according to W59. Visually inspect 100% of field welds.
 - .3 Verify and approve the verticality of the steel elements according to the standards mentioned in the specifications.
 - .4 Check and approve the torque of the assembly bolts. Check 15% of the bolts and 100% of the braces.
 - .5 Check and approve painting and touch-ups done at the job site.
 - .6 Approve the galvanization method.
 - .7 Verify the certification of erectors and welders.
 - .8 Inspect 100% of the welds at the braces using a non-destructive method.
 - .9 Check the metal deck fasteners.

1.4 ACCESS TO THE SITE

- .1 Allow testing and inspection agencies access to the job site as well as to fabrication and shaping shops located off-site.
- .2 Cooperate with these agencies and take all reasonable steps to ensure that they have the appropriate means of access.

1.5 PROCEDURE

- .1 Notify the appropriate agency and the Department Representative in advance when testing is required so that all parties involved can be present.
- .2 Submit samples and/or materials/materials for testing as specified in the specifications, in a timely manner and in a predetermined order so as not to delay the performance of the work.

- .3 Provide manpower and facilities to collect and handle samples and materials/materials on site. Also provide space for storage and curing of samples.

1.6 REJECTED WORKS OR STRUCTURES

- .1 Remove defective items found to be inconsistent with the Contract Documents and rejected by the Departmental Representative, either because they were not performed in a workmanlike manner or because they were made with defective materials or products, even if they have already been incorporated into the Work. Replace or remake the elements in question according to the requirements of the contract documents.
- .2 Where applicable, promptly repair any Work damaged in the course of the above-mentioned repair or replacement.
- .3 If, in the opinion of the Department Representative, it is not expedient to repair work that is defective or found not to be in accordance with the Contract Documents, the Department Representative will deduct from the Contract Price the difference in value between the work performed and that prescribed in the Contract Documents, the amount of such difference to be determined by the Department Representative.

1.7 REPORTS

- .1 Provide four (4) copies of test and inspection reports to the Department Representative.
- .2 Provide copies of these reports to the subcontractors responsible for the structures inspected or tested and/or the manufacturer/manufacture of the materials inspected or tested.

1.8 TESTS AND DOSAGE FORMULAS

- .1 Provide required test reports and dosage formulas.

1.9 SAMPLES OF WORKS

- .1 Prepare samples of the Work specifically required in the Specifications. The requirements of this section apply to all sections of the specifications in which samples of work are requested.
- .2 Construct the sample works at the various locations approved by the Department Representative.
- .3 Prepare samples of the Work for approval by the Departmental Representative within a reasonable time and in a predetermined sequence so as not to delay the execution of the Work.
- .4 Delay in the preparation of samples of the work shall not be sufficient reason for an extension of time for completion of the work and no such request shall be granted.
- .5 If necessary, the Department Representative will assist the Contractor in establishing a schedule for the preparation of work samples.
- .6 Samples of work may be part of the finished work.
- .7 Each section of the specifications that refers to samples of the work shall specify whether or not the samples may be part of the finished work and when they are to be removed, if at all.

1.10 FACTORY TESTS

- .1 Submit certificates of factory tests required in the various sections of the specifications.

1.11 MATERIALS, EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and other building systems.

1.12 QUALITY CONTROL MANUAL

- .1 Provide the Department Representative with four (4) copies of the test and inspection reports required in the various sections of the specifications.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 REFERENCES

- . 1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 SET UP AND REMOVAL OF EQUIPMENT

- .1 Provide for the necessary utilization of temporary utilities to enable the Work to be performed in the shortest possible time.
- .2 Dismantle and remove equipment from the job site when no longer required.

1.4 LAND RECLAMATION

- .1 Provide temporary pumping and drainage facilities necessary to keep excavations and land free of standing water. See Section 01 11 01 - General Instructions.

1.5 WATER SUPPLY

- .1 The contractor may use only those water supplies and drains that have been approved by the Department Representative or building manager.

1.6 HEATING AND VENTILATION

- .1 Provide temporary heaters required for the period of the Work, operate and maintain them and provide fuel for them.
- .2 Heaters used inside the building shall be vented to the outdoors or shall be operated without open flames. Solid fuel burning stoves shall not be used.
- .3 Provide appropriate climate control (heating and ventilation) in enclosed spaces for the following purposes:
 - .1 promote the progress of the work;
 - .2 Protect works and products from moisture and cold;
 - .3 Prevent condensation from forming on surfaces;
 - .4 Ensure proper ambient temperatures and humidity levels for storage, installation and curing of materials;
 - .5 Meet the requirements of workplace safety regulations.
- .4 Where work is in progress, maintain temperature at a minimum of 10 degrees Celsius.
- .5 Ventilation
 - .1 Prevent accumulation of dust, fumes, gases and fogging in areas that remain occupied

- during construction.
- .2 Provide a local exhaust system to prevent the accumulation of substances in the environment that may present a health hazard to the occupants.
- .3 Ensure that combustion gases are discharged in a safe manner and to a location where they will not present a health hazard to persons.
- .4 Provide ventilation to storage areas for hazardous or volatile materials.
- .5 Provide ventilation for temporary sanitary facilities.
- .6 Operate ventilation and exhaust equipment for a period of time after completion of work to completely remove from the environment any contaminants that may have been generated during the various construction activities.
- .6 The building's permanent heating system shall not be used when ready to be put into operation. In this case, assume full responsibility for any damage that may be caused.
- .7 Upon completion of work requiring commissioning of the permanent heating system, replace filters and clean equipment as recommended by the manufacturer.
- .8 Ensure that the Certificate of Substantial Performance and warranties for the permanent heating system do not become effective until the entire system has been substantially restored to its original condition and certified by the Department Representative.
- .9 Pay for temporary heating for the duration of the work.
- .10 Provide strict monitoring of the operation of heating and ventilation equipment at all times, ensuring that the following requirements are met
 - .1 Comply with applicable codes and standards.
 - .2 Implement safe practices.
 - .3 Prevent waste.
 - .4 Prevent damage to finishes.
 - .5 Vent combustion gases from direct fired appliances to the outdoors.
- .11 Assume full responsibility for damage to the Work due to improper heating or protective conditions maintained during the Work.

1.7 POWER SUPPLY AND LIGHTING

- .1 The Contractor shall be permitted to use only those electrical power sources assigned to him by the Departmental Representative or Building Manager.
- .2 Provide temporary lighting for the duration of the work and maintain the system. Fixtures shall provide a minimum of 162 lux of illumination at floors and stairs.
- .3 Provide site lighting as described in Section 01 52 00 - Site Facilities, Item 1.8.1.

1.8 FIRE PROTECTION

- .1 Provide and maintain fire protection equipment as required by applicable insurance companies, codes and regulations.
- .2 Burning of waste materials and construction waste on the site is prohibited.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 TEMPORARY MEANS OF EROSION AND SEDIMENT CONTROL

- .1 Provide temporary erosion and sediment control measures to prevent loss of soil from storm water runoff or wind erosion and carryover to adjacent properties and walkways. Such means shall be in accordance with the requirements of the authorities having jurisdiction.
- .2 Inspect, maintain, and repair established control measures as necessary until permanent vegetation is well established.
- .3 Remove control equipment at the appropriate time and restore and stabilize surfaces disturbed during this work.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Not applicable.

1.2 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189, Exterior Alkyd Wood Primer.
 - .2 CGSB 1.59, Exterior enamel paint, glossy, with alkyd resins.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete - Materials and Methods of Concrete Construction/Tests and Standard Practices for Concrete.
 - .2 CSA-0121, Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2, Scaffolds.
 - .4 CAN/CSA-Z321, Signs and Symbols in the Workplace.
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 INSTALLATION AND REMOVAL OF EQUIPMENT

- .1 Prepare a site layout plan indicating the proposed location and dimensions of the area to be fenced and used by the contractor, the number of site trailers required, the access routes to the fenced area, and the fence installation details.
- .2 The work site shall be fenced as specified in Section 01 56 00 Temporary Access Structures and Protections, Item 1.5.
- .3 Indicate areas that need to be gravelled to prevent mud deposits.
- .4 Indicate any additional areas or staging areas.
- .5 Provide, set up or arrange for the necessary site facilities to allow the work to be carried out in the shortest possible time.
- .6 Dismantle equipment and remove it from the job site when no longer needed.

1.4 SCAFFOLDING

- .1 Scaffolds: conform to CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs and any temporary facilities necessary for the performance of the work.

1.5 LIFTING EQUIPMENT (if applicable)

- .1 Supply, install, maintain and operate hoists, elevators and cranes required to move workers, materials/materials and equipment. Make financial arrangements with subcontractors for the use of hoisting equipment.
- .2 The operation of hoists, elevators and cranes must be entrusted to qualified workers.
- .3 Obtain permission from the Department Representative at least 48 hours in advance of the installation of cranes, elevators or hoists on the work site.
- .4 Provide for the required temporary roads and soil foundation improvements required for the movement and installation of this equipment around the buildings.
- .5 Provide foundations for lifting equipment.
- .6 Install lifting equipment in locations authorized by the Department Representative.

1.6 ON-SITE STORAGE / ALLOWABLE LOADS

- .1 Ensure that the work is performed within the limits specified in the contract documents. Do not unreasonably encumber the site with materials and equipment.
- .2 Do not overload or allow overloading of any part of the structure so as not to compromise its integrity.

1.7 PARKING FOR WORKERS

- .1 The Contractor will be responsible for managing the parking of its employees to respect the areas assigned by the Departmental Representative.

1.8 LIGHTING

- .1 The Contractor shall provide temporary lighting required for the performance of his work including parking areas, the trailer site and along the security perimeter. See Section 01 35 43 - Environmental Protection.

1.9 SECURITY MEASURES

- .1 Throughout the duration of the work, the Contractor shall hire and pay for reliable security personnel to provide after-hours and vacation supervision of the work site and materials/equipment thereon.

1.10 SITE OFFICES

- .1 Within the controlled site enclosure, provide a ventilated office heated to 22 degrees Celsius, equipped with lighting to provide 750 lux of illumination and of sufficient size to accommodate site meetings, and provide a table for the display of drawings.
- .2 The Contractor shall provide temporary telecommunications facilities, including telephones, fax machines, data processing systems, including lines, and equipment for its own use and for the Department's Representative, and shall provide for the connection of such facilities to the main networks and shall be responsible for the costs of all such services.
- .3 Provide a complete and identified first aid kit and store it in an easily accessible location.

1.11 STORAGE OF MATERIALS, EQUIPMENT AND TOOLS

- .1 Provide lockable, weatherproof sheds for the storage of materials, equipment and tools and keep them clean and tidy.
- .2 Leave materials and equipment on the job site that do not need to be kept out of the weather, but ensure that they interfere with the work as little as possible.

1.12 SANITARY FACILITIES

- .1 The Contractor shall be permitted to use only those sanitary facilities assigned to him by the Departmental Representative or the building manager.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Where necessary, provide access roads and temporary detour routes to maintain traffic flow.
- .2 Maintain and protect traffic on affected roadways during construction unless specifically directed otherwise by the Department Representative.
- .3 Provide measures for traffic protection and detour, including supervisors and flagmen, installation of barricades, installation of lighting around and in front of equipment and work area, installation and maintenance of appropriate warning signs, hazard signs and directional signs.
- .4 Protect the traveling public from damage to persons and property.
- .5 The Contractor's rolling stock used to transport materials/materials into and out of the work site shall interfere with traffic as little as possible.
- .6 Ensure that the existing tracks and allowable load limits on the tracks are adequate. The Contractor shall be responsible for repairing damaged tracks as a result of construction.
- .7 Constructing the necessary access roads and site tracks.
- .8 Construct work site trails with adequate grade and width; avoid sharp curves, blind turns and dangerous intersections.
- .9 Provide lighting, signage, barricades and distinctive markings necessary for safe traffic flow.
- .10 Take the necessary steps to suppress dust to ensure the safe conduct of business at all times.
- .11 The location, grade, width and alignment of access roads and construction trails are subject to the approval of the Department Representative.
- .12 Lighting fixtures shall provide full visibility across the full width of the work site tracks and work areas during evening and night shifts. Lighting shall not disturb the neighborhood See Section 01 35 43, Environmental Protection, Item 1.19, Light Pollution.
- .13 Provide for snow removal during the work period.
- .14 Upon completion of the work, dismantle the construction site trails designated by the Department Representative. Resurface the site ready for landscaping.

1.14 CLEANING

- .1 Remove debris, waste and packaging materials from the construction site daily as described in Sections :

Section 01 74 11Cleaning

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

- .2 Remove dust and mud from paved roads on a daily basis.
- .3 Clean the public roadway around the work site of mud or other dirt every day, mainly during excavation work. If this work is not done properly, the City of Quebec may send a cleaning bill to the contractor.

PARTIE 1 PRODUCTS

1.1 NO OBJECT

- .1 Not applicable.

PARTIE 2 EXECUTION

2.1 NO OBJECT

Not applicable.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59, Exterior enamel paint, glossy, with alkyd resins.
 - .2 CAN/CGSB 1.189, Exterior Alkyd Wood Primer.
 - .3 CAN/CGSB-138.1, Wire Mesh for Fencing.
 - .4 CAN/CGSB-138.2, Galvanized Steel Fence Frame
 - .5 CAN/CGSB-138.3, Installation of Chain Link Fences.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Steel.
 - .2 CSA-O121, Douglas Fir Plywood.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.
- .2 The Contractor shall submit the completed Material Information Form in block letters for each of the products described in this section, along with the Data Sheets and Shop Drawings. No data sheets or shop drawings will be reviewed unless the Material Information Form is included and properly completed, and the data sheets and shop drawings will be automatically rejected.

1.4 SET UP AND REMOVAL OF EQUIPMENT

- .1 Provide, erect or arrange for temporary access and protection works necessary to allow the work to be carried out as soon as possible.
- .2 Dismantle equipment and remove it from the job site when no longer needed.

1.5 SITE FENCE

- .1 Provide one or two lockable truck access gates and at least one pedestrian gate, as directed by the Department Representative and in compliance with traffic restrictions on adjacent streets. Provide locks and keys for gates.
- .2 Erect, around the work site, a temporary palisade consisting of an OMEGA type fence made of steel mesh that does not allow climbing, 1.8 m high. The fence will be closed on the exterior side of the work site over its entire height by a semi-transparent green fabric.

1.6 GUARDRAILS AND BARRIERS

- .1 Provide and install rigid and secure guardrails and barriers around deep excavations, unenclosed service shafts, stairwells and elevator shafts, and along the edges of floors and roofs.
- .2 Furnish and install such items as required by the authorities having jurisdiction and as required by the Department Representative.

1.7 SHELTERS, ENCLOSURES AND CLOSURES AGAINST THE WEATHER

- .1 Provide and install watertight closures at door and window openings, at the top of service ducts, and at other openings in floors, roofs and walls.
- .2 Cover floor surfaces where walls are not yet erected; seal other openings. Provide enclosures inside the building where temporary heating is required.
- .3 Enclosures must be able to withstand wind pressure and snow loads.
- .4 These protections will have to allow to maintain during all the duration of the building site the temperatures required in the building site according to the nature of the specified work.
- .5 During the roofing work, install all the protections required to ensure the complete waterproofing of the roofs at all times and adequately protect the building from any water infiltration during the work.

1.8 DUST SCREENS

- .1 Provide dust barriers or insulated partitions to enclose spaces where dust generating activities are performed to protect workers, the public, finished surfaces or areas of the work, and personnel.
- .2 Keep these screens and move them as needed until these activities are completed.

1.9 ACCESS ROADS TO THE SITE AND ON THE SITE

- .1 Provide the necessary lanes, paths, ramps and pedestrian crossings to access the work site and the site.
- .2 As a first step, build the main access road allowing access to the whole site, see the indications on the plans. Do civil work, i.e. excavation, installation of various pipes, backfill and new traffic area. The construction of the new access road to the site will have to be in service without paving before starting the construction of the buildings.
- .3 Erect fencing at the site entrance and around the work areas. Fencing at the site entrance shall allow access at all times to site users, delivery services and emergency services. Fencing around the work areas shall not block traffic at any time.
- .4 After the relocation of the main access, close off the existing access as indicated on the plans. The existing access must not be used to access the site at any time after the relocation work.

1.10 ROAD TRAFFIC

- .1 Retain the services of qualified flagmen and provide such warning devices and flares, barriers, lights and fixtures as may be necessary for the performance of the work and protection of the public.

1.11 ACCESS ROADS FOR EMERGENCY VEHICLES

- .1 Provide access to the site and work area for emergency vehicles and provide adequate clearance.

1.12 PROTECTION OF PUBLIC AND PRIVATE PROPERTY IN THE VICINITY

- .1 To protect neighbouring public and private property from any damage that may result from the execution of the work.
- .2 If necessary, assume full responsibility for any damage caused.

1.13 PROTECTION OF FINISHED BUILDING SURFACES

- .1 During the entire period of execution of the work, protect the equipment as well as the completely or partially finished surfaces of the work.
- .2 Provide the necessary screens, tarps and barriers.
- .3 Three (3) days prior to the installation of the protective elements, confirm with the Department Representative the location of each and the installation schedule.
- .4 Assume full responsibility for damage to structures due to lack of or inadequate protection.

1.14 WORK IN THE BUILDING

- .1 Work will be required inside the building.
- .2 This work consists of electrical, heating and ventilation connections. This work will have architectural implications mainly in the ceilings. (See architectural plans).
- .3 The Contractor shall, at the beginning of the work, submit a schedule to the Department Representative for approval.

1.15 LOW COV MATERIALS

- .1 Composite wood and agricultural fiber products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

1.16 WASTE MANAGEMENT AND DISPOSAL

- .1 The work shall be governed by a waste management plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. The work in this section shall be performed in accordance with the requirements of that plan.
- .2 Maintain and protect traffic on affected roadways during construction unless specifically directed otherwise by the Department Representative.

1.17 CLEANING

- .1 Remove debris, trash and packing materials from the construction site daily.
- .2 Remove dust and mud from paved roads on a daily basis (if necessary).
- .3 Store materials/materials recovered during demolition work.
- .4 Do not store new or salvaged materials/materials in the site facilities.

- .5 After each day of work in blocks A, B & C, everything must be cleaned up and the debris and waste must be removed from the site.

PARTIE 2 PRODUCT

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

- .1 Not applicable.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 REFERENCES

- .1 References to relevant standards may be made in each section of the specification.
- .2 Comply with the above standards, in whole or in part, as specified.
- .3 In cases where there is doubt as to the compliance of certain products or systems with the relevant standards, the Departmental Representative reserves the right to verify compliance through testing.
- .4 If the products or systems comply with the contract documents, the cost of such testing shall be borne by the Department Representative, otherwise it shall be borne by the Contractor.
- .5 Comply with the latest version of the standard references in effect at the time of bid submission.

1.3 QUALITY

- .1 Products, materials, equipment, appliances and parts used in the performance of the work shall be new, in perfect condition and of the best quality for the purpose for which they are intended. If required, provide proof of the nature, origin and quality of the products supplied.
- .2 The purchasing policy is to acquire, at minimum cost, items containing the highest possible percentage of recycled and recovered materials, while maintaining satisfactory levels of competitiveness. Make reasonable efforts to use recycled materials/materials in both the construction and performance of the work.
- .3 Products found to be defective prior to completion of the work will be rejected, regardless of the findings of previous inspections. Inspections are not intended to relieve the Contractor of responsibility, but merely to reduce the risk of omission or error. The Contractor shall be responsible for the removal and replacement of defective products at his own expense, and shall be responsible for any delays and costs resulting therefrom.
- .4 In the event of a dispute as to the quality or suitability of the products, only the Departmental Representative will be able to determine the issue based on the requirements of the contract documents.
- .5 Unless otherwise specified in the specification, promote consistency by ensuring that materials or components of the same type are from the same manufacturer.
- .6 Permanent labels, trademarks, and nameplates prominently displayed on implemented products are not acceptable unless they provide an operating instruction or are displayed on equipment installed in mechanical or electrical plant rooms.

1.4 EASE OF OBTAINING THE PRODUCTS

- .1 Immediately following the signing of the contract, review the delivery requirements for the products and anticipate any delays. If delays in the delivery of products are foreseeable, notify the

Departmental Representative so that steps can be taken to substitute replacement products or to make the necessary corrections in sufficient time to avoid delaying the work.

- .2 If the Department Representative has not been notified of foreseeable delivery delays at the start of the work, and if it appears likely that performance of the work will be delayed, the Department Representative reserves the right to substitute other comparable products that can be delivered more quickly without increasing the contract price.

1.5 STORAGE, HANDLING AND PROTECTION OF PRODUCTS

- .1 Handle and store products in a manner that avoids damage, tampering, or soiling, and in accordance with the manufacturer's instructions, where applicable.
- .2 Store bundled or batch products in their original packaging; leave the packaging, label and manufacturer's seal intact. Do not unpack or untie products until ready to incorporate into the work.
- .3 Products susceptible to weather damage should be stored in a weatherproof enclosure.
- .4 Hydraulic binders should not be placed directly on the ground or on a concrete floor, nor should they be in contact with walls.
- .5 Sand for use in mortars and grouts should be kept dry and clean. Store it on wooden platforms and cover it with waterproof tarpaulins in bad weather.
- .6 Place lumber, sheet and panel materials on rigid, flat supports so that they do not rest directly on the ground. Provide a slight slope to allow condensation water to drain away.
- .7 Store and mix paint products in a heated, well-ventilated area. Remove oily rags and other flammable waste from work area daily. Take all necessary precautions to avoid the risk of spontaneous combustion.
- .8 Replace damaged products at no additional cost, to the satisfaction of the Department Representative.
- .9 Touch up damaged factory finished surfaces to the satisfaction of the Department Representative. Use the same products for touch-ups as for the original finish. No finishing or touch-up product may be applied to nameplates.

1.6 TRANSPORT

- .1 Pay for the transportation of products required for the execution of the work.

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise specified in the specification, install or set up products according to the manufacturer's instructions. Do not rely on labels and containers provided with products. Obtain a copy of the manufacturer's written instructions directly from the manufacturer.
- .2 Notify the Department Representative in writing of any discrepancies between the specification requirements and the manufacturer's instructions so that appropriate action can be taken.
- .3 If the manufacturer's instructions have not been followed, the Department Representative may require, without increasing the contract price, the removal and reinstallation of products that have been improperly placed or installed.

1.8 QUALITY OF WORKMANSHIP

- .1 The work shall be of the highest quality and shall be performed by tradesmen qualified in their respective disciplines. Notify the Departmental Representative if the work to be performed is such that it is not likely to achieve the desired results.
- .2 Do not employ unqualified or unqualified persons to perform the work assigned to them. The Department Representative reserves the right to deny access to the work site to any person deemed incompetent or negligent.
- .3 Only the Department's Representative can resolve disputes regarding workmanship and labor qualifications, and his or her decision is final.

1.9 COORDINATION

- .1 Ensure that workers cooperate with each other in the completion of the work. To exercise close and constant supervision of their work.
- .2 It is the Contractor's responsibility to ensure the coordination of the work and the placement of the penetrations, sleeves and accessories.

1.10 ITEMS TO BE CONCEALED

- .1 Unless otherwise specified, conceal electrical conduits, ducts and wiring in floors, walls and ceilings of finished rooms and areas.
- .2 Before concealing items, inform the Departmental Representative of any abnormal conditions. Install as directed by the Departmental Representative.

1.11 REHABILITATION

- .1 Performs remedial work required to repair or replace parts or components of the Work found defective or unacceptable. Coordinate work on affected adjoining structures as required.
- .2 Reclamation work shall be performed by specialists familiar with the materials and equipment used and shall be performed in such a manner that no part of the work is damaged or is likely to be damaged.

1.12 LOCATION OF EQUIPMENT

- .1 The location shown for appliances, outlets, and other electrical or mechanical equipment shall be considered approximate. Prior to performing any work, coordinate with the Department Representative to determine the exact location of appliances.
- .2 Inform the Departmental Representative of any problems that may be caused by the siting of an appliance and proceed with the installation as directed.

1.13 FASTENERS - GENERAL

- .1 Unless otherwise specified, provide metal accessories and fasteners with the same textures, color and finish as the item being secured.
- .2 Avoid any electrolytic action between metals or materials of different nature.
- .3 Unless stainless steel or other fasteners are specified in the appropriate section of the specifications, use corrosion-resistant, hot-dipped galvanized steel fasteners and anchors to secure exterior structures.

- .4 Anchor spacing must be determined based on the limit loads and shear strength to ensure a permanent solid anchor. Anchors made of wood or any other organic material are not acceptable.
- .5 Use as few exposed fasteners as possible; space them evenly and install them carefully.
- .6 Fasteners that could cause spalling or cracking of the element in which they are anchored will be rejected.

1.14 FIXINGS - MATERIALS

- .1 Use fasteners of standard commercial shapes and sizes, of suitable material, with a finish suitable for the intended use.
- .2 Unless otherwise specified, use heavy-duty, semi-fine grade, hex head fasteners. Use 304 grade stainless steel for outdoor installations.
- .3 Bolt shanks should not extend beyond the top of the nuts by more than their diameter.
- .4 Use standard washers on fixtures and equipment and sheet metal lock washers with soft packing where vibration is present. When securing fixtures and equipment to stainless steel components, use resilient washers.

1.15 PROTECTION OF WORKS IN PROGRESS

- .1 Do not overload any part of the building. Unless otherwise specified, obtain written approval from the Department Representative before cutting, drilling or bushing any framing member.

1.16 EXISTING UTILITY NETWORKS

- .1 Where connections to existing systems are to be made, they shall be made at such times as may be determined by the local authority having jurisdiction, with the least possible interference with the progress of the work, the occupants of the building, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain in service utility lines that are functional. If pipelines are discovered during the course of the work, seal them in a manner approved by the responsible authorities, locate and record the sealing points.

1.17 PRODUCT SELECTION

- .1 In accordance with the terms and conditions of the contract, the decision of the Department Representative is final and conclusive with respect to the work. This includes decisions as to whether or not the quality or properties of the materials or products furnished or proposed to be furnished, meet the requirements of the work.
- .2 Within 7 days of the Department Representative's written request, submit the following information for the proposed materials and equipment:
 - .1 Name and address of the manufacturer.
 - .2 Trade name, model and catalog number.
 - .3 The technical data sheet.
 - .4 Manufacturer's instructions for installation, assembly, or application.
 - .5 Evidence of arrangements to procure the proposed materials and/or equipment.
- .3 Contractor's options for selecting products for bidding:
 - .1 Products specified as "acceptable products": Select a named product.

- .2 Products specified as "acceptable products" in the specification meet the specified requirements. Other products may exist that meet the specified requirements but have not been listed.
 - .3 When three or more products are listed, the Contractor shall select one of the listed products.
 - .4 When products are specified by the referenced standard only, select a product that meets or exceeds the specified standard.
 - .5 When products are required to be listed on the Canadian General Standards Board (CGSB), select a product from the schedule.
 - .6 Where materials or products are specified by prescriptive or performance requirements, select any material or product that meets or exceeds the requirements.
 - .7 If the Contractor wishes to use other products in lieu of specified "acceptable products", the Contractor shall follow the procedures established by the Department Representative.
 - .8 The term "acceptable product" is deemed to be a complete and functional product as described by a manufacturer's name, catalog number, trade name, or any combination thereof.
- .4 If the Contractor wishes to propose an equivalent product, it must be proposed to the Department Representative during the bidding period for approval. No substitutions will be allowed after contract award except in exceptional circumstances.

Products

1.18 NO OBJECT

- .1 Not applicable.

PARTIE 2 Execution

2.1 NO OBJECT

- .1 Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 CLEANLINESS OF THE SITE

- .1 Keep the work site clean and free of debris and waste materials.
- .2 Remove debris and waste materials from the job site daily at predetermined times or dispose of them as directed by the Department Representative. Waste materials shall not be burned on the job site.
- .3 Keep building access roads free of ice and snow. Pile snow in designated areas only
- .4 Arrange for and obtain permits from the appropriate authorities for the disposal of debris and waste materials.
- .5 Provide on-site containers for the disposal of debris and waste materials.
- .6 Provide and use separate, marked containers for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of debris and waste materials off site.
- .8 Clean interior surfaces prior to the start of finishing work and keep these areas free of dust and other impurities during the work in question.
- .9 Store volatile wastes in closed metal containers and dispose of them off site at the end of each work period.
- .10 Ensure proper ventilation of the premises during the use of volatile or toxic substances. However, the use of the building ventilation system for this purpose is prohibited.
- .11 Use only cleaning products recommended by the manufacturer of the surface to be cleaned, and use them according to the manufacturer's recommendations.
- .12 Schedule cleaning so that dust, debris, and other dirt that is kicked up does not fall back onto freshly painted wet surfaces and contaminate building systems.

1.3 FINAL CLEANING

- .1 Upon substantial completion of the Work, remove surplus materials, tools, and construction equipment and materials no longer required for the remainder of the Work.
- .2 Remove debris and waste materials and leave the area clean and ready for occupancy.
- .3 Before final inspection, remove excess materials, tools, equipment and construction materials.
- .4 Dispose of waste materials off the job site at predetermined times or as directed by the Department Representative. Waste materials shall not be burned on the job site.
- .5 Arrange for and obtain permits from the appropriate authorities for the disposal of debris and waste materials.
- .6 Clean and polish glass, mirrors, hardware, wall tiles, chrome or enamel surfaces, laminate surfaces, stainless steel or porcelain enamel components, and mechanical and electrical appliances. Replace any broken, scratched or damaged glass.

- .7 Remove dust, stains, marks and scratches from decorative structures, mechanical and electrical appliances, furniture, walls and floors.
- .8 Clean reflectors, diffusers and other lighting surfaces.
- .9 Dust and vacuum interior building surfaces, including cleaning behind grills, louvers, dampers and screens.
- .10 Wax, soap, seal or otherwise treat floor coverings according to manufacturer's instructions.
- .11 Examine finishes, fixtures and materials to ensure that they meet prescribed requirements for function and workmanship.
- .12 Sweeps and cleans sidewalks, steps and other outdoor surfaces; sweeps or rakes the rest of the grounds.
- .13 Remove dirt and other elements that mar the exterior surfaces.
- .14 Clean and sweep roofs and gutters.
- .15 Thoroughly clean materials and equipment, and clean or replace filters on mechanical systems.
- .16 Clean roofs, downspouts, drains, gutters and outlets.
- .17 Clear crawl spaces and other accessible concealed spaces of debris or excess materials.
- .18 Remove snow and ice from building access roads.
- .19 Clean and sweep hard surfaced areas.

1.4 DAILY CLEANING DURING THE WORKS INSIDE THE EXISTING BUILDING

- .1 Particularly for work that will take place inside the building outside the working hours of the building occupants (see Section 01 11 01, item 1.9) the Contractor shall do a complete cleanup of the corridors and areas where the work has taken place after each day of work. Do not leave anything in the corridors on the day of the acoustic tiles. Act as if no work had been done.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. Work in this section shall be performed in accordance with the requirements of this plan.
- .2 Maintain and protect traffic on affected roadways during construction unless specifically directed otherwise by the Department Representative.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements
- .2 Section 02 41 16.01 - Building Demolition
- .3 Section 02 82 00.01 - Asbestos removal (minimum precautions)
- .4 Section 02 82 00.02 - Asbestos removal (medium precautions)
- .5 All sections of the specification that refer to this section.

1.2 WASTE MANAGEMENT OBJECTIVES

- .1 Prior to the commencement of construction, meet with the Departmental Representative to review the waste management objectives and the waste minimization plan proposed by the Trade Contractor with respect to construction, renovation and demolition (CRD) waste generated by the project.
- .2 The overall waste management goal is to reduce the total flow of construction/demolition waste to landfills by at least 90 percent. Prior to completion, provide documentation to the Department Representative certifying that comprehensive waste management, recycling, reuse/recyclable and reusable/re-employable materials measures and procedures have been implemented.
- .3 Minimize the amount of non-hazardous solid waste generated by the work; maximize source reduction, reuse/recycling of solid waste generated by CRD activities.
- .4 Protect the environment and prevent damage from environmental pollution. Refer to section 01 35 43 - Environmental Protection.

1.3 RELATED REQUIREMENTS

- .1 All sections of the specification that refer to this section.
- .2 The contractor shall refer to the Government of Canada's "Green Government Policy", latest edition, with respect to the management and disposal of construction/demolition waste from the project.

1.4 REFERENCES

- .1 Definitions
 - .1 **Approved / Licensed Recycling Facility:** Recycler approved by an applicable provincial authority, or other approved equipment recyclers.
 - .2 **Class III Non-Hazardous Materials:** Construction, renovation and demolition waste.
 - .3 **Construction, Renovation and/or Demolition Waste (CRD):** Non-hazardous Class III solid waste generated by construction, renovation and/or demolition activities.
 - .4 **Cost-Revenue Analysis Plan (CRAP):** A plan based on data from the waste reduction plan to track the economics of waste management practices.
 - .5 **Landfill - inert waste:** Bituminous materials and concrete only.

- .6 **Source separation program (SSWP):** Implementation and coordination of activities on an ongoing basis to ensure that designated wastes are separated into pre-defined categories and directed for recycling and reuse/repurposing, thereby maximizing recovery and the potential for reduced disposal costs.
- .7 **Recyclability:** Characteristic of a product or material that can be recovered at the end of its life cycle and transformed into a new product for reuse.
- .8 **Recycling:** The process of collecting or transforming waste and used materials to allow them to be reintroduced into the consumption cycle as new products.
- .9 **Recycling:** Operations involving the sorting, cleaning, processing and reconstitution of solid waste and other discarded materials or materials to promote their use in a form different from their original state. Recycling does not include the burning, incineration or thermal destruction of waste.
- .10 **Reuse/recycling:** The repeated use of a product or material in its original form for a different purpose in the case of reuse and a similar purpose in the case of recycling. Reuse/recycling includes the following.
 - .1 The recovery of products and materials that can be reused/repurposed, generated by the retrofit of a structure or work, prior to demolition, for resale, reuse, reemployment within the same project, or storage for future use.
 - .2 The return to suppliers of products and materials that can be reused/repurposed, such as pallets and unused products.
- .11 **Salvage:** Removal of load-bearing and non-load-bearing building components and materials during deconstruction or dismantling of industrial, commercial or institutional structures for reuse/recycling.
- .12 **Sorted waste:** Waste already classified by type.
- .13 **Source separation:** Separation of different types of products and waste materials from the moment they become waste.
- .14 **Waste Audit (WA):** A detailed inventory with estimated quantities of waste that will be generated by the construction, demolition, deconstruction and/or renovation work. The WA includes an assessment, by volume and mass, of the quantities of waste materials and wastes that will be reused/repurposed, recycled or landfilled.
- .15 **Waste Recovery Report:** A detailed report of the final results, which quantifies the cumulative weights and percentages of waste reused/repurposed, recycled and landfilled throughout the course of the work. Measures the achievement of the Waste Reduction Plan (WRP) goals and notes lessons learned.
- .16 **Waste Management Coordinator (WMC):** The Specialty Contractor's representative responsible for overseeing waste management activities and coordinating reporting, documentation and sample submission requirements.
- .17 **Waste Reduction Plan (WRP):** A written document that explores opportunities to reduce, reuse/recycle waste generated by the project. Prescribes recovery goals, implementation and reporting procedures, deliverables and responsibilities. Waste reduction plan information from the waste audit.
- .2 **References**
 - .1 Recyc-Québec
 - .1 Construction/Renovation/Reconstruction Documentation Center.

- .2 Fact Sheet - Construction, Renovation and Demolition Waste
- .2 Canadian Environmental Protection Act, 1999.
- .3 Quebec Environment Quality Act and its regulations.
- .4 Quebec Residual Materials Management Policy (2011-2015).
- .5 Public Works and Government Services Canada's Guide to Environmentally Responsible Construction and Renovation.

1.5 USE OF PREMISES AND FACILITIES

- .1 Perform the work with minimal disruption to the normal use of the premises.
- .2 Maintain established security measures for the facility. Implement interim security measures approved by the Department Representative.

1.6 STORAGE, HANDLING AND PROTECTION OF MATERIALS

- .1 Store recovered scrap materials at locations designated by the Department Representative for reuse/recycling or recycling.
- .2 Unless otherwise specified, scrap material to be disposed of shall become the property of the Specialty Contractor.
- .3 Protect, stockpile, store and catalog recovered items.
- .4 Separate non-recoverable components from recoverable components. Transport and deliver non-recoverable components to the authorized disposal facility.
- .5 Protect framing members left in place and salvaged scrap materials from movement and damage.
- .6 Support structures affected by the work. If the safety of the building is in jeopardy, stop the work and notify the Departmental Representative immediately.
- .7 Protect surface water drainage structures from damage or obstruction; protect electrical and mechanical systems.
- .8 Provide on-site facilities and containers to collect and store reusable/recyclable materials.
- .9 Sort and store waste materials generated by the project in designated areas.
- .10 Prevent contamination of waste materials intended for recovery and recycling in accordance with the acceptance requirements of designated treatment facilities.
 - .1 It is recommended that waste materials be separated at the source.
 - .2 Take the collected waste materials to an off-site processing facility for sorting.
 - .3 Obtain bills of lading, receipts and/or weigh tickets for waste materials sorted and removed from the premises.
 - .4 Materials reused/repurposed on-site are considered recovered and should be included in any report.

1.7 WASTE DISPOSAL

- .1 Burial of scrap or waste materials is prohibited.
- .2 No person shall dispose of waste, volatile materials, mineral spirits, hydrocarbons or paint thinner into any watercourse or storm or sanitary sewer.

- .3 Maintain a construction waste log indicating the following.
 - .1 The number of bins and their size.
 - .2 The type of waste placed in each bin.
 - .3 The total tonnage of waste generated.
 - .4 The total tonnage of waste reused/recycled.
 - .5 The destination of the waste that will be reused/repurposed or recycled.
- .4 Recover materials from the site as the work progresses.
- .5 Prepare a project summary to monitor the destination and quantities of each type of waste material identified in the waste audit.

1.8 WORK SCHEDULE

- .1 Coordinate waste management with other activities to ensure an orderly work flow.

PARTIE 2 EXECUTION

2.1 GENERAL

- .1 Perform the work in accordance with the DRP and SWDP.
- .2 Handle in accordance with applicable codes and regulations for waste that is not reused/repurposed, recycled or recovered.

2.2 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.
- .2 Final Cleanup: Remove excess materials/equipment, waste materials, tools and equipment from the site in accordance with Section 01 74 11 - Cleanup.
- .3 Waste management
 - .1 Remove recycling bins and dumpsters from the job site and dispose of materials at the appropriate facilities.
 - .2 Source-separate waste materials for reuse/recycling and place in designated areas.

2.3 WASTE RECYCLING

- .1 Based on the list below, sort waste materials from the general waste stream and place in separate piles or containers, with the approval of the Department Representative and in accordance with applicable fire safety regulations.
 - .1 Identify containers or drop-off areas.
 - .2 Provide instructions for disposal practices.
- .2 The sale of waste materials on site is prohibited.

2.4 WASTE RECOVERY REPORT

- .1 At the end of the project, prepare a written waste recovery report indicating the quantities of materials reused/repurposed, recycled or disposed of, as well as the following

- .1 Indicate the final recovery results and measure the achievement of the waste reduction plan objectives.
- .2 Compare final quantities/percentages of recovered materials with initial projections from the waste audit and waste reduction plan. Explain variations.
 - .1 Supporting documents.
 - .2 Waybills and tracking forms.
 - .3 Description of problems, solutions and lessons learned.

2.5 LEADING AUTHORITY ON THE ENVIRONMENT WITHIN THE FEDERAL AND PROVINCIAL GOVERNMENTS

- .1 Sustainable development, environment and fight against climate change.
675 René-Lévesque Blvd. René-Lévesque East,
Quebec City, QC G1R 5V7
General information: 418-521-3830 / 800-561-1616

PARTIE 3 EXECUTION

3.1 NO OBJECT

- .1 Not applicable.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 ADMINISTRATIVE PROCEDURES

- .1 Acceptance of Work Procedure:
 - .1 Contractor's Inspection: The Contractor shall inspect his work, identify defects and deficiencies, and make the necessary repairs to bring the work into compliance with the requirements of the Contract Documents.
 - .1 Notify the Department Representative in writing upon completion of the Contractor's inspection and submit documentation that corrections have been made;
 - .2 Then submit a request to have the work inspected by the Departmental Representative.
 - .2 Inspection by the Ministry Representative:
 - .1 The Department Representative will conduct an inspection of the work with the Trade Contractor to identify defects and deficiencies.
 - .2 The Contractor shall make the requested corrections.
 - .3 Task Completion: Submit a document in French certifying that the tasks listed below have been completed.
 - .1 The work is complete and has been inspected and found to be in compliance with the requirements of the contract documents;
 - .2 Failures and defects identified during inspections have been corrected;
 - .3 The equipment, materials and systems have been tested for a period of 30 consecutive days with no faults, have been adjusted and balanced, and are fully operational;
 - .4 The necessary training on the operation of the equipment, materials and systems has been provided to the Departmental Representative's staff.
 - .5 The commissioning of mechanical devices, equipment and systems has been completed;
 - .6 The work is complete and ready for final inspection;
 - .4 Final Inspection:
 - .1 When all of the above tasks are completed, submit a request for final inspection of the work to be performed jointly by the Departmental Representative and the Contractor.
 - .2 If the work is deemed incomplete by the Department Representative and then complete the items that have not been completed and reapply for inspection.
 - .3 If the Department Representative is required to stop by to check for deficiencies more than two (2) times, his costs for the additional visits will be charged to the Contractor in the form of a holdback from the contract.

1.3 FINAL CLEANING

- .1 Perform cleaning in accordance with Section 01 74 11 - Cleaning.
- .1 Remove excess materials/materials, waste, tools and equipment from the site.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

- Not applicable.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements

1.2 SUMMARY

- .1 Content of the section
 - .1 Project file, samples and quotes;
 - .2 Technical data sheets, materials, equipment and finishing products, and related information;
 - .3 Building management sheets and manual;
 - .4 Replacement materials/equipment, special tools and spare parts;
 - .5 Guarantees and bonds of the premises.
- .2 Priority
 - .1 For work performed for the Federal Government, Division 1 sections take precedence over the technical sections of the other divisions of the project specifications.

1.3 DOCUMENTS AND ELEMENTS TO BE SUBMITTED

- .1 The instructions must be prepared by competent persons with the required knowledge of the operation and maintenance of the products described;
- .2 Submitted copies will be returned after final inspection of the work, along with the Department Representative's comments;
- .3 If necessary, review the content of the documents before resubmitting them;
- .4 All replacement materials and equipment, special tools and spare parts furnished shall be new, free from defects and of the same quality of workmanship as the products used in the performance of the Work and in accordance with the technical sections of the Specifications. Receive and inventory all materials, replacement equipment, special tools and spare parts. Submit the inventory list to the Department Representative. Include the approved list in the building management manual. Maintain a receipt for all parts delivered and submit before final payment.
- .5 Upon request, provide documentation confirming the type, source of supply and quality of products provided;
- .6 Defective products will be rejected, even if previously inspected, and must be replaced at no additional charge;
- .7 Assume the cost of transporting these products.
- .8 When existing equipment is dismantled or replaced, the existing blue lamicoids on the equipment must be returned to the Department Representative.

1.4 PRESENTATION OF THE BUILDING MANAGEMENT MANUAL (BMM)

- .1 Present the data in the form of an instruction manual;
- .2 Use rigid, vinyl, three D-ring, loose-leaf binders 219 mm x 279 mm with spines and pockets;
- .3 When multiple binders are required, group the data in a logical order. Be sure to indicate the contents of the binders on the spine of each;
- .4 The cover page of each binder should include the document designation, i.e., "Building Management Manual," the project designation, and the table of contents;
- .5 Organize content as defined in the table of contents template to be provided by the Department Representative.
- .6 Provide the drawings with a reinforced and perforated tab. Insert them in the binder and fold the large drawings according to the format of the text pages.
- .7 Data Sheets: Mark each sheet to clearly identify specific products, parts and installation information; delete all irrelevant information.
- .8 Drawings: Drawings are used to supplement the data sheets and to illustrate the relationship between the various components of the equipment and systems; they include control and schematic diagrams.
- .9 If necessary, to supplement the information on the data sheets, add additional instructions in a logical sequence and attach them to the manufacturer's instructions.

1.5 CONTENTS OF EACH VOLUME

- .1 Table of contents: indicate the project designation;
 - .1 The date of filing of the documents;
 - .2 The name, address and telephone number of the Consultant and Contractor and the names of their representatives;
 - .3 A list of products and systems, indexed by the contents of the volume.
- .2 For each product or system, indicate the following:
 - .1 Names, addresses and telephone numbers of subcontractors and suppliers, as well as local distributors of materials and spare parts.
- .3 Data sheets: mark each sheet to clearly identify specific products, parts and installation data; delete all irrelevant information.
- .4 Drawings: Drawings are used to complete the data sheets and to illustrate the relationship between the different elements of the equipment and systems; they include control and principle diagrams.
- .5 Typed text: as needed to complete the data sheets. Provide instructions in a logical sequence for each procedure, incorporating the manufacturer's instructions prescribed in Section 01 45 00 - Quality Control.

1.6 DOCUMENTS AND SAMPLES TO BE INCLUDED IN THE PROJECT FILE

- .1 In addition to the documents referenced in the General Conditions, maintain on the job site, for the Department Representative, a copy or set of the following documents:

- .1 Contractual drawings;
 - .2 Quote;
 - .3 Addendum;
 - .4 Change orders and other contract amendments;
 - .5 Revised shop drawings, data sheets and samples;
 - .6 Records of tests performed on site;
 - .7 Inspection certificates;
 - .8 Certificates issued by the manufacturers.
- .2 Store project file documents and samples in the field office separate from documents used for the work. Provide filing cabinets and shelves and a secure storage area.
 - .3 Label the documents and file them according to the list of section numbers in the project file's table of contents. Clearly print "Project File" on the label of each document.
 - .4 Keep project file documents clean, dry and legible. Do not use them as construction documents.
 - .5 The Department Representative shall have access to documents and samples in the project file for inspection.

1.7 RECORDING OF FIELD CONDITIONS

- .1 Record the information on two (2) sets of opaque drawings and retain one copy in the project file.
- .2 Record information using red felt tip markers.
- .3 Record information as the work proceeds. Do not conceal the work until the required information has been recorded.
- .4 Contract Drawings and Shop Drawings: Legibly indicate each item of data, so as to show the work as it is, including the following.
 - .1 The measured depth of the foundation elements from the level of the first finished floor.
 - .2 The location, measured in the horizontal and vertical planes, of underground utilities and appurtenances in relation to permanent above ground development.
 - .3 Location of utility lines and interior fixtures, measured in relation to visible and accessible building elements.
 - .4 On-site modifications to the dimensions and details of the work.
 - .5 Changes made as a result of change orders.
 - .6 Details not included in the original contract documents.
 - .7 References to shop drawings and related modifications.
- .5 Specifications: Record each item of data to describe the work as it is, including the following.
 - .1 Manufacturer's name, trademark and catalog number of each product actually installed, including optional and replacement items.
 - .2 Changes subject to addenda or change orders.
- .6 Other Documents: Maintain manufacturers' certificates, inspection certificates, records of field tests required in each technical section of the specifications.

1.8 FINAL SURVEY CERTIFICATE

- .1 Submit the final survey certificate certifying compliance or non-compliance with the requirements of the Contract Documents of the location and grade of the completed Work.

1.9 MATERIALS AND SYSTEMS

- .1 For each piece of equipment and for each system: give a description of the normal operating device and constraints; give characteristic curves, with technical data and test results; also give a complete list and commercial number of the parts that can be replaced.
- .2 Provide lists of power circuits (distribution panels), including electrical characteristics, control circuits and telecommunications circuits.
- .3 Provide color-coded wiring diagrams of installed equipment.
- .4 Operating Procedures: Provide instructions and sequences for start-up, break-in and normal operation; regulation, control, shutdown, shutdown and emergency; summer and winter operation; and any other special instructions.
- .5 Maintenance: provide instructions for routine maintenance and troubleshooting as well as instructions for disassembly, repair and reassembly, alignment, adjustment, balancing and checking of components and systems.
- .6 Provide maintenance and lubrication schedules and a list of required lubricants.
- .7 Provide manufacturer's written instructions for operation and maintenance of components.
- .8 Provide descriptions of the sequence of operations prepared by the various manufacturers of equipment and control/regulation devices.
- .9 Provide the original manufacturer's parts list and the necessary illustrations, drawings and assembly diagrams for servicing.
- .10 Provide control diagrams of installed control/regulation devices prepared by the various manufacturers.
- .11 Provide Contractor's coordination drawings and color coded diagrams of installed piping.
- .12 Provide a list of valve tag numbers, indicating the location and function of each device, and reference to control and schematic diagrams.
- .13 Provide a list of original manufacturer's replacement parts with current prices and recommended quantities to be kept in stock.
- .14 Provide test and balance reports as required in Sections 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in the various technical sections of the specification.

1.10 MATERIALS AND FINISHING PRODUCTS

- .1 Building materials, finishes and other products to be applied: provide data sheets and indicate catalog number, dimensions, composition, and color and texture designations of products and materials. Provide ordering information for special products.
- .2 Provide instructions for cleaning agents and methods, recommended cleaning and maintenance schedules, and precautions against damaging methods and harmful products.
- .3 Additional requirements: as specified in the various technical sections of the specification.
- .4 Work with the Department Representative to establish work schedules in a manner that reduces conflicts and facilitates the Department Representative's use of the site.

1.11 SPARE PARTS

- .1 Provide spare parts in the quantities specified in the various technical sections of the specifications.
- .2 Replacement parts supplied shall be from the same manufacturer and of the same quality as the items incorporated in the Work.
- .3 Deliver and store spare parts at the specified location.
- .4 Receive and inventory all parts and submit the inventory list to the Department Representative. Insert the approved list into the maintenance manual.
- .5 Keep a receipt for all parts delivered and submit it before final payment.

1.12 REPLACEMENT MATERIALS / EQUIPMENT

- .1 Provide replacement materials and equipment in the quantities indicated in the various technical sections of the specifications.
- .2 Replacement materials and equipment shall be from the same manufacturer and of the same quality as the materials and equipment incorporated in the work.
- .3 Deliver and store replacement materials/materials at the specified location.
- .4 Receive and inventory replacement materials and equipment and submit the inventory list to the Department Representative. Insert the approved list into the maintenance manual.
- .5 Retain a receipt for all materials and equipment delivered and submit it prior to final payment.

1.13 SPECIAL TOOLS

- .1 Provide special tools according to the quantities prescribed in the various technical sections of the specifications.
- .2 Tools must be labeled as to their function and intended equipment.
- .3 Deliver and store special tools at the designated location.

- .4 Receive and inventory special tools and submit the inventory list to the Department Representative. Insert the approved list into the maintenance manual.

1.14 STORAGE, HANDLING AND PROTECTION

- .1 Store equipment and special tools in a manner that will prevent damage or deterioration.
- .2 Store equipment and special tools in their original, undamaged packaging with the manufacturer's seal and label intact.
- .3 Store items susceptible to weather damage in weatherproof enclosures.
- .4 Store paint and products that may freeze in a heated and ventilated area.
- .5 Evacuate damaged or deteriorated items or products and replace them at no additional cost, to the satisfaction of the Department Representative.

1.15 WARRANTIES AND GUARANTEES

- .1 Warranties must be worded as follows Her Majesty the Queen, Head of Canada.
- .2 Except for items placed in service with the authorization of the Department Representative, do not change the effective date of the warranty until the date of substantial completion of the work has been determined.
- .3 Ensure that the documents are in proper form, that they contain all the necessary information.

PARTIE 2 PRODUCTS

2.1 NO OBJECT

- .1 Not applicable.

PARTIE 3 EXECUTION

3.1 NO OBJECT

- .1 Not applicable.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements
- .2 Architectural, structural and electro-mechanical drawings and specifications of the present documents for submission.

1.2 REFERENCES

- .1 Canadian Council of Ministers of the Environment (CCME)
 - .1 PN 1327-2003, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .2 Canadian Standards Association (CSA)/CSA International
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.3 SUMMARY LIST OF WORK

- .1 This list is not exhaustive and does not relieve the Contractor of any responsibility. The Contractor must examine the plans of the various disciplines and carry out the work in the spirit of the plans and specifications.
 - .1 Temporary selective dismantling of sandwich panels from the exterior wall adjacent to the elevator #2 mechanical room, from the roof of the lean-to - level 14265.
 - .2 Dismantling of elevators # 1 and # 2 (see EXIM documents).
 - .3 Dismantling of vinyl baseboard.
 - .4 Dismantling a door/frame/hardware assembly for replacement.
 - .5 Various masonry works.
 - .6 Dismantling of an expanded metal grid (note C5 on the plan)
 - .7 Any other work requested in the plans and specifications or implicitly required to carry them out.
 - .8 Other demolition works as requested in the plans and specifications of the electro-mechanical engineer.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Workshop drawings
 - .1 Submit required data sheets and shop drawings in accordance with Section 01 33 00 - Submittal Documents/Samples.
 - .2 Shop drawings submitted shall bear the seal and signature of a qualified professional engineer recognized or licensed to practice in Canada, in the Province of Quebec.
- .3 Where requested by the authorities having jurisdiction, submit to the Departmental Representative for approval, shoring and bracing drawings for load-bearing or other walls prior to commencing

demolition work. Such drawings shall be prepared by a qualified engineer licensed to practice in Canada in the Province of Quebec and shall illustrate the proposed method of work.

- .4 Prior to commencing work on the site, submit a detailed waste minimization plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, which includes the following information :
- .1 Nature and expected quantities of materials to be recovered, reused/repurposed, recycled and landfilled expressed as a percentage.
 - .2 Selective demolition schedule.
 - .3 Number and location of recycling bins.
 - .4 Planned frequency of waste collection.
 - .5 Name and address of trucking companies waste management centers organizations accepting waste.

1.5 TRANSPORTATION, STORAGE AND HANDLING

- .1 Waste management and disposal.
- .1 Sort waste for reuse/recycling and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 CONDITIONS OF IMPLEMENTATION

- .1 Check the Designated Hazardous Materials List (Appendix A) and take the necessary steps to preserve the environment.
- .2 If any material resembling sprayed or trowelled asbestos or other material designated and listed as hazardous is discovered during the performance of the work, suspend the work, take appropriate precautions, and immediately notify the Department Representative.
- .1 Do not resume work until you receive written instructions from the Departmental Representative
- .3 Notify the Department Representative before obstructing access to the building or interrupting services.

PARTIE 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- .1 Shut down equipment, tools and machinery when not in use, unless extreme temperature conditions require continuous operation.
- .2 Demonstrate that tools, equipment and machinery are used in a manner that allows for the recovery of materials in the best possible condition.

PARTIE 3 EXECUTION

3.1 PREPARATORY WORK

- .1 Perform work in accordance with Section 01 35 29.06 - Health and Safety.
- .2 Before starting the work, check with Info-excavation to see which pipes are in the ground. Take into consideration that there is a concrete pad containing Hydro-Quebec electrical wiring. Take the necessary measures to have the supplier position the concrete pad.
- .3 Protection
 - .1 Take necessary steps to prevent displacement, collapse or other damage to utility lines, adjacent structures and portions of the building to be retained. Provide shoring and bracing of structures as required.
 - .2 Minimize dust and noise generated by the work, as well as inconvenience to the occupants of the premises.
 - .3 Protect the building's appliances, mechanical and electrical installations and utility lines.
 - .4 Provide necessary dust shields, tarps, guardrails, support members and other protective devices.
- .4 Disconnect and reroute electrical, telephone and telecommunication service lines as indicated on the Mechanical Engineer's drawings. Place cautionary markings on electrical conduits and equipment that must remain energized during demolition work to supply power to other structures.
- .5 Locate and protect utility lines. Do not touch utility lines that are in service or under tension and that cross the premises must not be moved.
- .6 Disconnect and seal off designated mechanical plant piping as specified on the engineering drawings.

3.2 DEMOLITION, RECOVERY AND DISPOSAL

- .1 Dismantle those portions of the existing building whose removal is necessary to permit construction of the new structure. Separate materials, and group them into separate piles according to whether they will be recycled and or reused/reemployed as per Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Refer to the demolition specifications and drawings for materials to be salvaged for reuse.
- .3 Reshape the edges of partially demolished building components to tolerances specified by the Department Representative to facilitate the installation of new components.
- .4 Unless otherwise specified, dispose of the removed materials to the reuse/recycling companies in accordance with the requirements of the competent authorities.

3.3 EVACUATION OF THE SITE

- .1 Transport materials for environmentally sound disposal through approved trucking companies and waste management centers identified in the waste reduction plan in accordance with applicable regulations. Materials may not be transported to any location other than the [trucking companies and waste management facilities listed in the waste reduction plan without written authorization from the Department Representative.

- .2 Dispose of other materials in accordance with applicable regulations at approved facilities identified in the waste reduction plan. Materials may not be moved to any other location than the facilities listed in the waste reduction plan without written approval from the Department Representative.

3.4 CLEANING AND RESTORATION OF THE PREMISES

- .1 Keep the premises clean and tidy throughout the demolition work.
- .2 Once the demolition work is completed, remove as soon as possible all waste and materials to be recovered.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 02 41 16.01- Demolition of construction.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A 496/A 496M-[07], Standard Specification for Steele Wise, Deformation, for Concrete Reinforcement.
- .2 CSA International
 - .1 CAN/CSA-A82-[F06], Clay and Shale Masonry Brick.
 - .2 CAN/CSA-A165 SERIES-[F04(R2009)], CSA Standards for Concrete Masonry Units [contains: A165.1, A165.2, A165.3].
 - .3 CAN/CSA-A179-[F04(C2009)], Mortar and Grout for Heavy Masonry.
 - .4 CAN/CSA-A370-[F04(R2009)], Masonry Connectors.
 - .5 CAN/CSA-A371-[F04(R2009)], Masonry in Buildings.
 - .6 CSA G30.18-[09], Carbon Steel Bars for Concrete Reinforcement.
 - .7 CSA S304.1-[F04(C2009)], Design of Masonry Structures.
- .3 Green Sal Environmental Standards (GS)
 - .1 GS-11-[2008, 2nd Edition], Paint and Castings.
- .4 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 South Cotas Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards.
 - .1 SCAQMD Ruel 1113-[A2007], Architectural Castings.

1.3 SCOPE OF WORK

- .1 Minor masonry work
 - .1 Do the masonry repairs (repointing) on the walls of the elevator mechanical room #2.
 - .2 Selective dismantling of a section of concrete masonry above the door of the mechanical room elevator # 2.
 - .3 Other drilling/blocking work as requested on the plans.

1.4 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.

- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which shall be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials and equipment in a clean, dry, well-ventilated area in accordance with the manufacturer's recommendations.
 - .2 Store salvaged masonry materials in a manner that protects them from [marks, scratches and scuffs].
 - .3 Replace defective or damaged materials and equipment with new materials and equipment.
- .4 Packaging Waste Management: Recover packaging waste for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PARTIE 2 PRODUCTS

2.1 FRAMES AND STUDS

- .1 Not applicable.

2.2 MORTARS AND GROUTS

- .1 Mortar: Conforms to CAN/CSA-A179.
 - .1 Pre-mixed mortar color as existing to be approved by the Department Representative.

PARTIE 3 EXECUTION

3.1 GENERAL

- .1 Unless otherwise specified, perform masonry work in accordance with CAN/CSA-A371.
 - .1 Remove the section of concrete block masonry identified by note **C11** (elevator #2).
- .2 To carry out the masonry works of plumb, level and alignment, by making joints identical to the existing ones.

3.2 IMPLEMENTATION

- .1 Masonry structures
 - .1 Carry out masonry repairs so that they are not visible

3.3 CLEANING

- .1 Cleaning the masonry, to remove the mortar marks on the brick.
- .2 Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.4 PROTECTION OF WORKS

- .1 Protect masonry and other structures from marks, mortar spatter and other damage. Use non-staining protective sheeting.
- .2 Repair damage to adjacent materials and equipment caused by the installation of masonry units.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the metal work in such a manner that the work will fully accomplish its intended purpose.

1.3 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
- .1 ANSI/NAAMM MBG531, Metal Bar Grating Manual.
- .3 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A 53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A167, Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet, and Strip.
- .3 ASTM A 269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .4 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.40, Alkyd Primer for Structural Steel.
- .2 CAN/CGSB-1.181, Zinc Rich Coating, Organic and Prepared.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Technical data sheets
- .1 Submit required data sheets and manufacturer's product specifications and documentation in accordance with Section 01 33 00 - Documents/Samples to be Submitted.

- .2 Workshop drawings
 - .1 Submit required shop drawings in accordance with Section 01 33 00 - Submittal Documents/Samples.
 - .2 Shop drawings shall indicate or show materials, web thickness, finishes, connections, joints, anchorage method and number of anchorage devices, supports, reinforcing members, details and accessories.

PARTIE 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- .1 Steel sections as described in the drawings.

2.2 STEEL STRUCTURES - GENERALITIES

- .1 Work shall be straight, square, properly aligned and conform to the specified dimensions; joints shall be tight and properly secured.
- .2 Unless otherwise specified, self-tapping, self-releasing flat head screws should be used for screwed connections.
- .3 Whenever possible, the works should be adjusted and assembled in the workshop, and delivered ready for installation.
- .4 Exposed welds shall be continuous along the entire length of the joint and shall be filed or ground to a smooth, even surface.
- .5 Hot-dip galvanize after fabrication all metallic structures located outdoors or exposed to excessive humidity (70% RH and more) and according to the indications in the plans for the interior of the building.
- .6 All fasteners shall be concealed unless otherwise specified.
- .7 All fasteners shall be vandal resistant, Torx Plus type, unless otherwise specified.
- .8 The thickness of the materials shown on the drawings must be calculated before the zinc coating.

2.3 ASSEMBLY

- .1 Connections should be welded whenever possible; otherwise, they should be bolted. Exposed bolts shall be countersunk in holes and cut flush with the nuts. Exposed fasteners shall be of the same material, color and finish as the surfaces on which they are placed.
- .2 Joints shall be accurately fitted; exposed parts shall be flush; joints and mitres shall be tight. All risers shall be of equal height.
- .3 Welds and exposed ends of the profiles should be carefully ground or filed.
- .4 The elements must be assembled in the workshop, in elements as long and as complete as possible.
- .5 All steel fabrications shall be prepared to a high quality CISC AESS2 standard prior to receiving the various types of finishes.

2.4 LIST OF WROUGHT METAL ELEMENTS

- .1 Protective screen between the mechanical room and the elevator shaft # 1:

- .1 Galvanized steel frame in "L" shape 38 mm x 38 mm x 6 mm thick.
- .2 Galvanized steel mesh 50 mm x 50 mm, 2.2 mm gauge, spot welded @ 200 mm 4c to "L" frame.
- .3 Hexagonal head concrete screw anchor in galvanized carbon steel.

2.5 FINISH

- .1 Factory priming / painting by 09 91 23

PARTIE 3 Execution

3.1 REVIEW

- .1 Verification of Conditions: Prior to installation of metalwork, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows the work to be performed in accordance with the manufacturer's written instructions.
 - .1 Perform a visual inspection of surfaces/substrates in the presence of the Construction Manager.
 - .2 Immediately notify the Construction Manager of any unacceptable conditions found.
 - .3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Construction Manager.

3.2 ASSEMBLY

- .1 Assemble the elements according to the drawings.
- .2 Install metalwork square, plumb and level, accurately aligned and fitted, and ensure that joints and crossings are tight.
- .3 Supply and install appropriate anchors approved by the Professional, such as dowels, staples, anchor rods, expansion bolts, expansion shells and wing bolts.

3.3 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.
 - .1 Clean metal structures after installation to remove dust generated by construction or the surrounding environment.
 - .2 Final Cleanup: Remove excess materials/materials, waste materials, tools and equipment from the site in accordance with Section 01 74 11 - Cleanup.

3.4 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by the installation of metal structures.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 07 92 00 - Sealants for joints.
- .3 Section 08 11 13 - Metal Doors and Frames.
- .4 Section 09 21 16 - Gypsum Board Sheathing.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the carpentry work so that the work will be fully effective for its intended purpose.

1.3 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 American National Standards Institute/National Particleboard Association (ANSI/NPA)
 - .1 ANSI/NPA A208.1 (2009), Particleboard.
- .3 ASTM International
 - .1 ASTM D 1761, Standard Test Methods for Mechanical Fasteners in Wood.
 - .2 ASTM A653 / A653M-11, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .4 CSA International
 - .1 CAN/CSA-O80.20-M, Pressure Fireproofing Treatment of Lumber.
 - .2 CAN/CSA-O80.27-M, Pressure Fireproofing Treatment of Plywood.
 - .3 CSA B111, Wire Nails, Spikes and Staples.
 - .4 CAN/CSA-G164, Hot-dip galvanizing of irregularly shaped objects.
 - .5 CSA O112.9, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
 - .6 CSA O121, Douglas Fir Plywood.
 - .7 CAN/CSA-O141, Softwood Lumber.
 - .8 CSA O151, Canadian Softwood Plywood.
 - .9 CAN/CSA-O325, Construction Intermediate Sheathing.
- .5 Forest Stewardship Council (FSC)

- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .6 National Lumber Grading Board (NLGA)
 - .1 Grading rules for Canadian lumber.
- .7 Sustainable Forestry Initiative (SFI)
 - .1 SFI Standards.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulation Board for Buildings.
- .9 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2011 Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005 Adhesives and Sealants Applications.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Data sheets :
 - .1 Submit required data sheets and manufacturer's instructions and documentation for wood products and accessories. Data sheets must include product characteristics, performance criteria, dimensions, limitations and finish.
- .3 Environmental certification
 - .1 50% of the wood installed in the project shall be Forest Stewardship Council (FSC) certified and shall have an intact FSC chain of custody.
 - .2 Technical data sheets and FSC chain of custody certificate numbers for the wood-based materials shall be provided for approval prior to installation. Copies of the invoices for the wood-based materials shall all be provided, which shall show the supplier's FSC certificate number as well as the FSC numbers for each product type on the invoice.
- .4 Low VOC materials
 - .1 Composite wood and agricultural fiber products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

1.5 QUALITY ASSURANCE

- .1 Wood marking: classification stamp from an organization recognized by the Accreditation Council of the Canadian Lumber Standards Board.
 - .1 Each panel, piece or group of pieces of treated wood must bear the ULC label indicating the flame spread rating and smoke developed rating.
- .2 Marking of plywood, particleboard, oriented strand board (OSB) and composite wood panels: in accordance with applicable CSA and ANSI standards.
- .3 Certification in sustainable development.

- .1 Certified Wood: Submit a list of wood products used that meet the CAN/CSA-Z809 or FSC or SFI standard.

1.6 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which shall be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials and equipment off the floor indoors in a clean, dry, well-ventilated area according to the manufacturer's recommendations.
 - .2 Store wood in such a way as to protect it from marks, scratches and scrapes.
 - .3 Replace damaged materials and equipment with new materials and equipment.

PARTIE 2 PRODUCTS

2.1 GENERAL

- .1 The glue used to manufacture the plywood panels shall not contain urea formaldehyde. Provide a description sheet to this effect.

2.2 CONSTRUCTION WOOD

- .1 Lumber: softwood, S4S finish (4-sided bleached), with a moisture content not exceeding 19%, and conforming to the following standards and regulations:
 - .1 CAN/CSA-O141.
 - .2 NLGA, Grading Rules for Canadian Lumber.
- .2 Furring, wedges, nailing strips, nailing bottoms, sub-frames, cleats and battens, chords, nailing bottoms for roof edges and joists.
 - .1 S2S finish elements are acceptable.
 - .2 Boards: "standard" category or higher.
 - .3 Dimensional lumber: "light (clear) framing" classification, "standard" or better.
 - .4 Posts and lumber (squares): "standard" grade or higher.

2.3 PLYWOOD PANELS

- .1 Douglas Fir Plywood (Type 1): Softwood, exterior grade, conforming to CSA O121 and CAN/CSA-O325.0, construction grade, standard quality, thickness as shown on drawings, moisture content 8% at time of manufacture, class G1S;
 - .1 For use in carpentry, framing, siding and other exterior work.
 - .2 To be used for all coatings and assemblies of roofing elements, roof parapets.
 - .1 16 mm thick panels.
- .2 Plywood (type 2): single-sided finish, thickness as shown on drawings, with phenol-formaldehyde glue.

- .1 To be used for anchorages in partitions and other interior works.
- .3 Plywood (type 3): single-sided finish, 16mm and 19mm thick, with fire retardant treatment.
 - .1 To be used for mounting panels for electromechanical equipment and in telecom rooms, as indicated on electromechanical and architectural drawings.
- .4 Nails, studs and staples: comply with CSA B111 standard.
- .5 Patented fastening devices: toggle bolts, expanding plugs with bottom pullers, screws with lead or inorganic fiber bushings, explosive cartridge devices, provided for this purpose by the manufacturer, in accordance with AINSI B18.6.1, and other applicable standards.
- .6 Fasteners for exterior structures and interior structures in areas of high humidity: galvanization according to ACNOR G174 with a minimum zinc coating of 610 g/m² or stainless steel grade 302 or 304.
- .7 Nailing washers: flat caps of at least 25mm diameter, made of sheet metal, at least 0.4mm thick, shaped to avoid any bulging.

2.4 FIREPROOFING PRODUCTS FOR WOOD

- .1 Treat wood by pressure impregnation with fire retardant chemicals in accordance with CSA Standard 080.20-M for lumber, CSA Standard 080.27-M for plywood and ULC-S102.
- .2 SCAQMD Rule 1113, Architectural coatings.
- .3 VOC content of no more than 350 g/L.
- .4 After treatment with a water-soluble flame retardant, dry the material so that the moisture content does not exceed 19%.
- .5 Structures to be treated with fireproofing product :
 - .1 All anchor bottoms built into fire rated partitions;
 - .2 Any other work specifically indicated on the drawings.

2.5 WOOD ADHESIVES

- .1 Wood Adhesive: Polyvinyl acetate or urethane resin for wood products. Of the type recommended by the wood manufacturer.

PARTIE 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Prior to installation of products, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows work to be performed in accordance with the manufacturer's written instructions.
 - .1 Perform a visual inspection of surfaces/substrates in the presence of the Construction Manager.
 - .2 Immediately notify the Construction Manager of any unacceptable conditions found.
 - .3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Construction Manager.

3.2 PREPARATORY WORK

- .1 Apply a preservative to the wood elements before installing them.
- .2 Apply preservative by dipping or brushing. Coat surfaces until saturated and allow product to soak in for at least three (3) minutes on solid wood pieces and one (1) minute on plywood.
- .3 Prior to installation, liberally brush preservative on all surfaces exposed by cutting, straightening and drilling in the field.

3.3 GENERAL

- .1 Comply with the requirements of the NBC, latest edition, Part 9, as supplemented by the following articles of this Section.
- .2 Perform carpentry work according to AWMAC recommendations, of standard quality.
- .3 Perform joinery finishing to AWI quality standards.
- .4 Use only sound materials, in the longest length to minimize joints. Use materials free of warpage that cannot be corrected by anchoring or fastening. Discard warped materials and other defects that would compromise the quality of the work.
- .5 Adjust present work with that of other trades. Trace and adjust for accurate fit. Match location of furring, nailing bottoms, shims and similar supports with fasteners of other work. Verify dimensions shown and record dimensions before proceeding.
- .6 Use galvanized fasteners for all exterior work or in wet locations.

3.4 INSTALLATION

- .1 Shape as directed and cut as required for installation square, plumb and aligned to the work involved. Attach accurately and securely to substrates with bolts and other appropriate fasteners to accommodate applied loads.
- .2 Install furring and blocking to space and support wall and ceiling finishes, sheathing, trim, soffits, siding and other specified work.
- .3 Install furring and blocking to ensure flatness and verticality of the work, with a permissible deviation of 1:600.
- .4 Install sub-frames, nailing strips and trims around the openings to support the frames and other work.
- .5 Install roof frames, fascia boards, nailing rods, chords and other required wood supports and secure with galvanized fasteners.
- .6 Mounting panels for electromechanical and telecommunication equipment:
 - .1 Install full surface plywood panels (type 3) on the wall for mounting electrical and communication equipment as shown on the drawings.
 - .2 Install the plywood panels on a profile frame as shown on the drawings.
 - .3 Coordinate work with Divisions 26, 27 and 28.
- .7 Provide all nailing backings required whether or not shown on the drawings and necessary for the execution of the work. Include, among other things, the nailing heads for the required elements.
- .8 Assemble, anchor, fasten, attach and brace the elements to ensure the necessary strength and rigidity.

- .9 If necessary, countersink the holes so that the bolt heads do not protrude.
- .10 For flexible cladding materials, use nailing discs, according to the material manufacturer's instructions.

3.5 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.
- .2 Final Cleanup: Remove excess materials/equipment, waste materials, tools and equipment from the site in accordance with Section 01 74 11 - Cleanup.

3.6 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by the installation of non-load bearing metal framing.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 06 10 00 - Carpentry.
- .3 Section 07 92 00 - Sealants.
- .4 Section 09 21 16 - Gypsum Board Sheathing.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda form part of this section.
- .2 This section shall be read and the drawings relating to it reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Specialty Contractor shall provide all materials, equipment, labour and services required for the complete execution of the air sealing and wall vapour barrier work in such a way that the work perfectly fulfils the purpose for which it is intended.
- .4 Scope of work :
 - .1 Reconstruction of the air-vapour barrier integrity of the existing exterior sandwich panel sections during their reinstallation following the work on elevator #2.
 - .2 Relocation and replacement of exterior sandwich panel (ventilation, CME room).
 - .3 The contractor is responsible for identifying the types of signs on site.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-19.13M-M87, One-Component, Elastomeric, Chemically Cured Sealant.
 - .2 CAN/CGSB-19.24M-M90, Multi-component, Chemically Cured Sealant.
 - .3 CGSB-19-GP-14M-FM84, One-component, solvent-evaporation, butyl-polyisobutylene based sealant.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D4541-02, Standard Test Method for Puss-Off Strength of Coatings Using Portable Adhesion Testers.
 - .2 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .3 ASTM E783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
 - .4 ASTM E1186-03, Standard Practices for Air Leakage Site Detection in Building Envelope and Air Retarder Systems.
- .3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit the required data sheets along with the manufacturer's specifications and documentation. Data sheets shall include product characteristics, performance criteria, dimensions, stresses and finish.
 - .2 Submit Material Safety Data Sheets (MSDS) as required under the Workplace Hazardous Materials Information System (WHMIS), as per Section 02 81 01 - Hazardous Materials.
- .3 Quality Assurance: Submit the following documents in accordance with Section 01 45 00 - Quality Control.
 - .1 Notify the Construction Manager, in writing, of any deviation of the substrate condition from the requirements specified in PART 3, INSPECTION.
 - .2 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical and performance requirements.
 - .3 Provide manufacturer's instructions, including any modifications for specific handling, application and clean-up procedures.
 - .4 Manufacturer's Field Inspection Reports: Submit copies of the manufacturer's written reports showing that the work meets the specified criteria not later than three (3) days after completion of the inspections specified in PART 3, ON-SITE QUALITY CONTROL.

1.5 QUALITY ASSURANCE

- .1 Qualification
 - .1 Applicator: the application of the materials must be carried out by a company specialised in the execution of the work provided for in this section, with at least 5 years of experience.
 - .1 The use of air and vapour barrier systems must be approved by the material manufacturer.
- .2 Samples of the work
 - .1 Construct a sample of the work in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct a panel representative of an exterior wall, 3 m long by 3 m high, with a window frame and insulation. The panel should show the interfaces and sealants between the different materials.
 - .3 The wall panel must be built in the indicated location.
 - .4 The sample may be part of the finished work.
 - .5 Wait 24 hours before starting the work to allow the Professional to inspect the sample of the work.
- .3 Site Meetings: The manufacturer's on-site inspections required by PART 3, ON-SITE QUALITY CONTROL, shall include site visits at the following stages:

- .1 Once the products have been delivered and stored on the site, and the preparatory and other preliminary work has been completed, but before the start of the implementation of the work covered by this section;
- .2 Two (2) times during the progress of the work, i.e. once the work is 25% complete and then 60% complete;
- .3 Once the work is completed and the cleaning is finished.

1.6 TRANSPORT, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements.
- .2 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.
- .3 Avoid accidental spills. If spills occur, immediately notify the Construction Manager and clean up.
- .4 In the event of an accidental spill, clean up the spill and return the surfaces to their original condition.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Sort waste for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Place substances that meet the definition of toxic or hazardous waste in designated containers.
- .3 Ensure that empty containers are sealed and stored properly out of reach of children for disposal.

1.8 IMPLEMENTATION CONDITIONS

- .1 Use solvent-borne sealants and vapour-releasing adhesives in open areas with ventilation.
- .2 Ventilate confined spaces in accordance with Section 01 51 00 - Temporary Utility Services.
- .3 Maintain temperature and humidity at levels recommended by the material manufacturers before, during and after installation.

1.9 SCHEDULING

- .1 Schedule the work in accordance with Section 01 32 16.07 - Work Scheduling - Bar Chart (GANTT).
- .2 Match the installation of air and vapour barrier materials with the installation of related sealing materials and devices.

1.10 GUARANTEE

- .1 In the case of sheet sealing, the guarantee is 12 months.
- .2 Provide a three (3) year warranty as per Section 01 78 00 - Documents/Elements to be submitted upon completion of the work.
- .3 The warranty shall cover the sealants and the membrane sheet waterproofing installed:
 - .1 that do not provide the intended air and water tightness;

- .2 that have a loss of adhesion or cohesion;
- .3 or don't take;
- .4 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: do not exceed the VOC content limits set out in Green Seal GC-03, Anti-corrosive Paints, Second Edition, January 7, 1997;
- .5 Clear wood finishes, floor coatings, stains and shellac varnishes applied to interior components: shall not exceed the VOC content limits set out in South Coast Air Quality Management District (SCAQMB) Rule 1113, Architectural Coatings, effective January 1, 2004;
 - Transparent wood finishes: varnish, lacquering;
 - Floor coverings;
 - Primers: water repellent, sanding primers, all others;
 - Shellac varnish: transparent, pigmented;
 - Dyes.
- .4 Wood composite and agricultural fibre products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

PARTIE 2 PRODUCTS

2.1 WATERPROOFING

- .1 Air/vapour barrier: Self-adhesive elastomeric membrane conforming to ASTM e96 standard for application on the following surfaces: Concrete, metal panels, gypsum plywood.
- .2 Roll of air/vapour barrier membrane same type as .1 but provide in 330 mm wide roll for use as polishing and transition membrane.

2.2 SEALING COMPOUNDS

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

2.3 APPRÊT

- .1 Primer Depending on the type of membrane and the manufacturer's recommendations, the primer shall be compatible with the waterproofing and the substrate.

2.4 SANDWICH INSULATION PANEL SYSTEM

- .1 Laminated sandwich panel system, all characteristics as existing.
- .2 Composition (for submission) :
 - .1 Interior linings in smooth, rolled steel, 22 gauge, pre-painted in the factory, colour white to be determined from the manufacturer's std range.
 - .2 Factory-expanded polyisocyanurate foam insulation, CFC-free, minimum density of 2.2 lb / ft³, 64 mm thick.

- .3 Exterior cladding with the same profile as the existing (reference profile: VicWest CL7040), pre-painted in the factory, brown colour to be determined in the manufacturer's std range.
- .4 Staggered tongue and groove joints.
- .5 Dimensions 915 mm (L) x height as existing.

2.5 ACCESSORIES

- .1 Fixings: bars and anchors in galvanized steel, 0.6 mm thick at the perimeter of the openings.

PARTIE 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations and specifications, including any available technical bulletins, handling, storage and application instructions, and data sheets.

3.2 GENERAL

- .1 Perform the work in accordance with the Sealant and Caulking Guide Specification published by the Sealant and Waterproofers Institute, with respect to materials and installation methods.

3.3 INSPECTION

- .1 Ensure that the surfaces are ready to receive the work specified in this section and that the installation conditions are adequate.
- .2 Ensure that all surfaces are clean, dry, sound, even, continuous and meet the manufacturer's requirements.
- .3 Report any unsatisfactory conditions to the contractor in writing.
- .4 Work shall not commence until the deficiencies have been corrected. The commencement of work by the Trade Contractor signifies the Departmental Representative's acceptance of the condition of the work.

3.4 PREPARATORY WORK

- .1 Remove loose or foreign material that may compromise the bond of the materials.
- .2 Ensure that all substrates are free of oil and excessive dust accumulations.
- .3 Ensure that there is no moisture on the surface of the substrates before applying the self-adhesive membrane and primer.
- .4 According to the manufacturer's instructions, prime the surface of the substrates that are to receive the air/vapour barrier membrane.

3.5 IMPLEMENTATION

- .1 Apply materials according to manufacturers' instructions.
- .2 Bond the sheet membrane to the gypsum boards, priming the surfaces first.

- .1 Caulk with a sealant according to section 07 92 00 - Joint Sealants, to obtain a perfect seal.
- .2 Make the joints overlapping, on a solid support.
- .3 Install a sheet metal waterproofing membrane between the window door frame and the waterproofing materials of the adjoining walls.
 - .1 Caulk so as to obtain a perfectly watertight structure.
 - .2 Make the joints overlapping, on a solid support.
 - .3 Use a sealant according to Section 07 92 00 - Joint Sealants to obtain a perfect seal.
- .4 Apply sealant when the temperature is within the recommended range.
 - .1 Consult the manufacturer of the product if it cannot be applied under the prescribed conditions.

3.6 ON-SITE QUALITY CONTROL

- .1 On-site inspections by the manufacturer
 - .1 Obtain a written report from the manufacturer confirming compliance of the work with the specified criteria for handling, application, protection and clean-up of the work, and submit this report in accordance with the DOCUMENTS / SAMPLES TO BE SUBMITTED section of PART
 - .2 The manufacturer shall make recommendations for the use of the product(s) and carry out periodic visits to verify that the implementation has been carried out in accordance with his recommendations.
 - .3 Schedule site visits in accordance with the QUALITY ASSURANCE section of PART 1.

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation and performance testing, remove excess materials, waste, tools and equipment from the site.

3.8 PROTECTION OF THE STRUCTURE

- .1 Protect finished work in accordance with Section 01 61 00 - General Product Requirements.
- .2 Take the necessary precautions to prevent damage to the work being carried out under this section from adjoining works.
- .3 Protect the finished work from the weather.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Division 05 - Structure.
- .3 Section 09 21 16 - Gypsum Board Cladding.
- .4 Section 09 22 16 - Non-load-bearing metal framing.
- .5 Section 09 91 23 - Interior and exterior painting work.
- .6 Division 26 - Electrical (Electromechanical specifications).

1.2 SCOPE OF WORK

- .1 This section covers the fire sealing of the following structures, all based on the elements requiring fire resistance as stipulated in the architectural drawings:
 - .1 Elements passing through concrete floors,
 - .2 Elements passing through gypsum, concrete block, concrete or brick walls and partitions,
 - .3 Junctions of different materials (example: gypsum to steel bridging),
 - .4 Closing of openings left free by the dismantling of mechanical/electrical elements in walls, floors and ceilings,
 - .5 Any other element requiring fire resistance as required by the construction details,
 - .6 Any through element in mechanics / electricity and structure,
 - .7 Any item required on the engineering plans, when these plans refer to the architectural plans,
 - .8 Intumescent fireproof coating for beams and columns in mechanical room # 2 as shown on the plans.

1.3 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Contractor shall furnish all materials, equipment, labor and services required for the complete performance of the fire protection work so that the work will fully accomplish its intended purpose.

1.4 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

- .3 Underwriters' Laboratories of Canada (ULC).
 - .1 ULC-S115, Fire Performance Test of Firestop Systems.
- .4 Guidelines for Evaluating Firestop Systems Engineering Judgments" published by the International Firestop Council
- .5 The National Building Code, 2010 Edition, Section 3.1.9: *Penetrations in Fire Separations and Other Fire-Resistant Assemblies*.

1.5 DEFINITIONS

- .1 Multi-component firestop assembly: groups of specific firestop elements or materials with a standardized design that allow for the creation of firestop assemblies in the field.
- .2 Single-component firestopping compound: firestopping materials with a standardized design, used alone as firestopping protection, without high temperature insulation or other similar materials.
- .3 Fully Sealed Penetrations (NBC, 3.1.9.1.1 and 9.10.9.6.1): means a sleeve or casing embedded in concrete (or other material) and having no annular voids.
 - .1 Penetrations are said to be "perfectly tight" when they ensure the integrity of the fire separation, which can then prevent the passage of smoke and hot gases on its unexposed side.

1.6 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit required data sheets and manufacturer's specifications and documentation. Specify product characteristics, performance criteria, dimensions, stresses and finish.
 - .2 Submit two (2) copies of applicable WHMIS (Workplace Hazardous Materials Information System) Material Safety Data Sheets. The sheets must indicate the VOC emission rate of the firestopping products during application and during the cure period.
- .3 Workshop drawings
 - .1 Submit shop drawings showing proposed location, materials, reinforcing members, anchors, fasteners and method of installation.
 - .2 Construction details should accurately reflect actual implementation conditions.
 - .3 Shop drawings of proposed firestop systems shall include the appropriate ULC approval document.
- .4 Product samples
 - .1 Submit two (2) 300mm x 300mm samples showing the proposed firestop materials or assemblies.
- .5 Quality Control: Submit the following documents in accordance with Section 01 45 00 - Quality Control.
 - .1 Certificates: Submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical and performance requirements.

- .2 Manufacturer's Instructions: Submit manufacturer's instructions for use, including any instructions for specific handling, application and cleanup procedures.

1.7 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: A company specializing in the installation of fire stopping materials or assemblies and having five (5) years of experience, acceptable to the manufacturer.
 - .1 The installer or specialty firm must be a registered member in good standing of the Firestop Contractors International Association (FCIA) or equivalent recognized by the DSIFC for a minimum of two (2) years prior to contract award or have been HAFSCS accredited for two (2) years.
 - .2 Installer of firestop/smoke control assemblies must be approved and recommended by the manufacturers of the specified products. Submit written confirmation of qualification.
 - .3 A direct representative of the manufacturer (not a distributor or agent) shall be on site during the initial installation of the firestop system to train the trade contractor's personnel in the selection and installation procedures. This shall be done in accordance with the manufacturer's written recommendations published in the literature and detailed drawings.
- .2 Samples of the work:
 - .1 Perform the required samples of the Work in accordance with Section 01 45 00 - Quality Control, and those set forth below.
 - .2 The sample of the work will be used for the purposes mentioned below.
 - .1 Evaluate quality of workmanship, substrate/substrate preparation, equipment operation and material placement.
 - .2 Determine compliance with the performance criteria; in this regard, the following tests shall be performed.
 - .3 Make the sample of the work in the place indicated by the Professional.
 - .4 Before proceeding with the actual work, wait 24 hours to allow the Professional to examine the sample of the work.
 - .5 Once accepted, the sample will be the minimum standard for the work. It may be incorporated into the finished work.

1.8 TEST REPORTS

- .1 Submit compliance test reports in accordance with CAN/ULC-2079, CAN/ULC-1479, CAN/ULC-S115, CAN/ULC-S102, ASTM-E814, ASTM-E1966 and ASTM-E84 for fire/smoke retardant materials.

1.9 TRANSPORTATION, STORAGE AND HANDLING

- .1 Packing, transport, handling and unloading:
 - .1 Transport, store and handle materials and equipment in accordance with the requirements of Section 01 61 00 - General Product Requirements.
 - .2 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.
 - .3 Deliver materials and equipment in good condition to the job site and in their original sealed container, marked with brand name, manufacturer, ULC approval and fire rating or other.

- .2 Storage and protection :
 - .1 Store materials and equipment indoors, dry and in accordance with the manufacturer's recommendations, in a clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials and equipment with new materials and equipment.
 - .3 Waste management and disposal:
 - .1 Sort waste for reuse/recycling and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .4 Discard any material that has been in contact with contaminants prior to use.

1.10 CONDITIONS OF IMPLEMENTATION

- .1 Meet WHMIS requirements for the use, handling, storage and disposal of hazardous materials, as well as labelling and provision of Material Safety Data Sheets recognized by Labour Canada.
- .2 Follow the manufacturer's recommendations for substrate temperatures, relative humidity and moisture content for application and drying of sealants, including special instructions for their use.
- .3 Ensure that air and substrate temperatures are maintained at 5°C for 24 hours before, during and after application. If necessary, heat the premises.
- .4 Ventilate work areas during installation of materials with portable supply and exhaust fans as recommended by the manufacturer.
- .5 During and after application of firestop assemblies and sealants, ensure that natural or mechanical ventilation, if required, is sufficient to allow complete drying of the sprayed products.
- .6 Temporarily isolate the work area to prevent air contamination of surrounding spaces.
- .7 Protect workers according to manufacturers' instructions.
- .8 Protect adjacent surfaces from debris and dust generated by firestop assembly materials and sealants.

1.11 WARRANTY

- .1 For work under this Section 07 84 00 - Fire Protection, the 12-month warranty period is extended to five (5) years.
- .2 Provide a written document, signed and issued on behalf of Canada, stating that the Work is warranted for a period of five (5) years from the date of signing the Final Certificate of Completion.
- .3 Include in the warranty, repair or replacement of products (materials and labor) that fail to perform as expected, fall apart or fail to cure properly.

PARTIE 2 PRODUCTS

2.1 GENERAL

- .1 All firestopping materials in a system must be from a single manufacturer.
- .2 Asbestos-free materials and assemblies that provide an effective barrier to flames, smoke and gases in accordance with the requirements of CAN-ULC-S115 and that are not larger than the size of the penetration or access point for which they are intended, Systems as described in Table UL2079 and in accordance with the special requirements prescribed in PART 3.

- .3 Degree of fire resistance of the assemblies and firestop sealants: According to the fire resistance legend on the drawings.
- .4 The fire-resistance rating of the installed firestop assembly shall comply with the requirements of the NBC.
- .5 Primers: in accordance with manufacturer's recommendations for material, substrate and intended use.
- .6 Water (if applicable): potable, clean and free of excessive amounts of harmful substances.
- .7 Restraining, supporting, backing and anchoring devices: in accordance with the manufacturer's recommendations and compatible with the assemblies implemented, tested and deemed acceptable by the competent authorities.
- .8 Vertical joint sealants: non-sagging products.

2.2

MATERIALS

- .1 Type 1 firewall assembly:
 - .1 Locations
 - .1 Penetration of conduits in concrete slabs and walls or concrete masonry walls.
 - .2 Sealing of holes in concrete slabs and walls or concrete masonry walls.
 - .2 Materials:
 - .1 Compacted rock wool and type A fireproof mastic.
- .2 Type 2 firewall assembly:
 - .1 Locations
 - .1 Sealing of gypsum walls and gypsum ceiling membrane.
 - .2 Materials:
 - .1 Type A firestop sealant.
- .3 Type 3 firewall assembly:
 - .1 Locations
 - .1 Sealing of the gypsum floor platform of elevator #2.
 - .2 Materials:
 - .1 Type B firestop sealant.
- .4 Type A firestop mastic (paintable) :
 - .1 Locations: any visible place
 - .2 Color: grey / paintable
 - .3 Materials: Acrylic based fire stopping compound, silicone, halogen, asbestos and solvent free, tested to 33% mobility for 500 cycles in accordance with UL 2079 and ASTM E1966 and resistant to water, smoke and fumes.
 - .4 Features:
 - .1 Time to form a film: +/- 15 minutes
 - .2 Curing rate: +/- 3 mm / 3 days
 - .3 Average shrinkage (ASTM C1241): 22.2
 - .4 Shrinkage: less than 20

- .5 Movement capacity: +/- 10
- .6 Temperature resistance: -22°F to 176°F (-30°C to 80°C)
- .7 Burning surface characteristics (CAN/ULC-S102): estimated flame spread: 15 / smoke development classification: 5
- .5 Testing in accordance with :
 - .1 UL 2079
 - .2 ASTM E 814
 - .3 ASTM E 1966
 - .4 ASTM E 84
 - .5 UL 1479
 - .6 CAN/ULC-S115
 - .7 CAN/ULC-S102
- .6 Reference product:
 - .1 HILTI CP 606 flexible firestop sealant
 - .2 Approved equivalent products.
- .5 Type B firestop mastic (non-paintable) :
 - .1 Locations: any non-visible location excluding assembly A above.
 - .2 Color: red / not paintable
 - .3 Materials: neutral elastic silicone-based fireproof sealant, gun compatible, solvent, halogen and asbestos free, smoke, fume, water and UV resistant and with maximum mobility meeting the requirement of 500 cycles
 - .4 Features:
 - .1 Time to form a film: +/- 15 min
 - .2 Curing time: +/- 2 mm/3 days
 - .3 Shrinkage: +/- 0 to 5
 - .4 Mobility (CAN/ULC-S115): +/- 33
 - .5 Thermal resistance -40 °C to 149 °C (-40 °F to 300 °F)
 - .6 Surface burning characteristics (CAN S102): flame spread: 0 / smoke development: 35
 - .5 Testing in accordance with :
 - .1 UL 2079
 - .2 ASTM E 814
 - .3 ASTM E 1966
 - .4 ASTM C 920
 - .5 UL 1479
 - .6 ASTM E 84
 - .7 ASTM G21
 - .8 CAN S102
 - .9 CAN/ULC-S115
 - .6 Reference product:
 - .1 HILTY CFS-S SIL GC silicone-based firestop sealant.

- .2 Approved equivalent products.
- .6 Intumescent fireproof coating
 - .1 Water-based intumescent fireproofing coating system, applied in a thin layer on structural steel: ULC listed fireproofing product, and approved for use on specified ULC models.
 - .2 Primers: recommended by the manufacturer and suitable for the substrate and intended use.
 - .3 Water-based intumescent coating: single-component water-based coating.
 - .4 List of acceptable products :
 - .5 A/D FIREFILM III, from A/D Fire Protection Systems;
 - .6 Firetex FX5120, by Sherwin Williams;
 - .7 Fire Finish CFP-SP WB, from Hilti;
 - .8 Other equivalent products in accordance with GCC-2015 General Conditions approved by the Construction Professional.
- .7 Finishing paint
 - .1 Two (2) component polyurethane paint, compatible type and recommended by the manufacturer of the intumescent coating, applied in at least two (2) coats, according to the recommendations of the paint manufacturer, color at the choice of the Construction Professional.

PARTIE 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's requirements, recommendations and written specifications, including any available technical bulletins, product handling, storage and application instructions, and data sheets.
- .2 Apply firestop/smoke control assembly materials in accordance with ULC approval requirements.

3.2 PROTECTION OF THE WORKS

- .1 Protect works installed by third parties from soiling or any other form of contamination.

3.3 SURFACE PREPARATION

- .1 Prepare surfaces to be contacted by firestopping and smoke control materials according to manufacturer's instructions.
- .2 Ensure that surfaces are clean, dry and at an acceptable temperature according to the manufacturer's instructions
- .3 Clean joint surfaces of deleterious substances such as dust, rust, oil, grease, rolling agents or lubricants and other materials detrimental to work performance.
- .4 Examine the size and condition of the voids to be filled to determine the thickness of material required

- .5 Do not apply sealants to joint surfaces with sealers, curing compounds, water repellents, paints or other coatings without testing materials for compatibility and performance. Remove coatings, if required.
- .6 Protect adjacent surfaces and equipment from spillage, scattering, chalking and other damage from fire retardant materials. Mask surfaces to prevent staining.
- .7 Ensure that equipment to be passed through the firestop assembly is installed and not covered with insulation prior to application of the products. Insulation shall be installed only after the work in this section is completed.
- .8 Ensure that ducts, pipes, equipment or other items that may interfere with the application of the fireproofing coating are not installed until the fireproofing is complete.
- .9 Before applying fireproofing products, ensure that steel surfaces are not primed or, if primed, that the primer is compatible.

3.4 WORK SCHEDULING

- .1 Proceed with implementation only after the documents/samples to be submitted have been reviewed by the Professional.
- .2 Fireproof the floors before installing the interior partitions.
- .3 Bonding to a metal substrate: Fire protection must be provided prior to the application of any fire retardant coating to ensure the required bond.

3.5 ON-SITE QUALITY CONTROL

- .1 Inspections: Before concealing or covering firestop materials or assemblies, inform the owner's representative that the structures are ready for inspection.
- .2 On-site inspections by the manufacturer.

3.6 CLEANING WORKS

- .1 Perform cleaning in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation and performance testing, remove excess materials, waste, tools and equipment from the site.
- .3 Remove temporary restraints after initial curing of fire and smoke barrier materials is complete.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Division 01 - General Requirements.
- .2 Division 04 - Masonry.
- .3 Section 06 10 00 - Carpentry.
- .4 Section 08 11 13 - Metal Doors and Frames.
- .5 Section 09 21 16 - Gypsum Board Cladding.
- .6 Section 09 22 16 - Non-load-bearing metal framing.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the joint sealant work in such a manner that the work will fully accomplish its intended purpose.
- .4 Scope of Work:
 - .1 Sealing of all new elements with existing elements.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
 - .2 LEED Canada-BE: E & E 2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System: Operations and Maintenance 2009.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB19-GP-5M-1984, One-Component, Acrylic-Based, Solvent-Evaporation Curing Sealant (April 1976 edition confirmed, incorporating Amendment Number 1).
 - .2 CAN/CGSB-19.13-M87, One-Component, Elastomeric, Chemically Cured Sealant.
 - .3 CGSB19-GP-14M-76, One-component, butyl-polyisobutylene, solvent-evaporation cure sealant (confirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component, Acrylic Resin Emulsion Sealant.
 - .5 CAN/CGSB-19.24-M90, Multi-Component, Chemically Cured Sealant.
- .3 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.4 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for joint sealants. Data sheets shall include product specifications, performance criteria, dimensions, limitations and finish.
 - .2 The manufacturer's data sheets should address the following.
 - .1 Caulking products.
 - .2 The primaries.
 - .3 Sealants (all types), including their compatibility with each other.
 - .3 Submit two (2) copies of the required WHMIS MSDSs as per Section 01 35 29.06 - Health and Safety 01 35 43 - Environmental Protection.
- .3 Samples
 - .1 Submit two (2) samples of each color and type of product offered.
 - .2 If required, for matching with adjacent materials, submit dried samples of sealants to be left exposed for each proposed color.
- .4 Manufacturer's instructions
 - .1 The instructions submitted must be for each of the products offered.

1.5 DOCUMENTS/ITEMS TO BE SUBMITTED UPON COMPLETION OF THE WORK

- .1 Submit the required documents/items in accordance with Section 01 78 00 - Documents/Elements to be submitted upon completion of work.
- .2 Operation and Maintenance Sheets: Provide operation and maintenance instructions to be incorporated into the Operations Manual.

1.6 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which must be labeled with the manufacturer's name and address.
- .3 Storage and handling
 - .1 Store materials and equipment off the floor indoors in a clean, dry, well-ventilated area according to the manufacturer's recommendations.

- .2 Store joint sealants in a manner that protects them from marks, scratches and scuffs.
- .3 Replace damaged materials and equipment with new materials and equipment.

1.7 CONDITIONS OF IMPLEMENTATION

- .1 Environmental conditions
 - .1 Apply sealants only under the following conditions.
 - .1 Ambient and substrate temperatures are within the limits established by the product manufacturer or are above 4.4 degrees Celsius.
 - .2 The substrate is dry.
 - .3 The manufacturer's recommendations regarding temperatures, relative humidity and substrate moisture content for the application and drying of the sealants, as well as special instructions for their use, are observed.
- .2 Joint width
 - .1 Install sealants only where joint widths are greater than those established by the manufacturer of the product for the applications indicated.
- .3 Subjective
 - .1 Sealants should be applied only after the substrate has been cleaned of all contaminants that may prevent adhesion.

1.8 QUALITY ASSURANCE/WORK SAMPLES

- .1 Perform the required samples of the Work in accordance with Section 01 45 00 - Quality Control
- .2 Samples shall show the location, size, profile and depth of joints, including the joint filler, primer and sealant.
- .3 The samples of the work will be used for the following purposes:
 - .1 Evaluate the quality of workmanship, substrate preparation, equipment operation and material placement
- .4 Carry out the samples of the work in the designated areas.
- .5 Wait 24 hours before starting the sealing work to allow the Professional to inspect the samples.
- .6 Once accepted, the samples will be the minimum standard for the work. They may be incorporated into the finished work.

1.9 WARRANTY

- .1 Submit a five (5) year written warranty on behalf of Canada, guaranteeing labour and materials against loss of waterproofing, cracking, spalling, loss of consistency, shrinkage, dripping, loss of adhesion and dulling of adjacent surfaces, from the date of qualified acceptance of the work
- .2 Include in the warranty the repair or replacement of products that do not provide a complete seal against smoke or water, become detached or do not cure properly.
 - Transparent wood finishes: varnish, lacquering;
 - Floor coverings;
 - Primers: water repellent, sanding primers, all others;

- Shellac varnish: transparent, pigmented;
 - Dyes.
- .3 Composite wood and agricultural fiber products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

PARTIE 2 PRODUCT

2.1 SEALING PRODUCTS

- .1 Caulking products that emit strong odors, contain toxic chemicals, or are not certified as a mold resistant type should not be used in air handlers.
- .2 If there is no alternative to using toxic products, restrict their use to areas where the fumes can be vented to the outdoors or where they will be contained behind an airtight system, or apply them several months before the area is occupied so that the fumes can be vented over the longest possible period.
- .3 In the case of sealants approved with a primer, only the primer in question should be used with the sealant.
- .4 Sealants selected for this project must be on the CGSB Commission on Sealant Certification's list of certified sealants.

2.2 SEALING PRODUCTS - DESCRIPTION

- .1 Silicone sealant with low resistance coefficient:
- .1 Conforms to ASTM C679, neutral curing silicone; colors to be selected from the manufacturer's standard series.
 - .2 Used at joints in precast concrete exterior walls and at joints in adjacent surfaces, as well as at other locations indicated on the drawings.
- .2 Two-component urethane sealant:
- .1 Non-sagging product, conforms to CAN/ONCG-19.24-M90 standard at type 2, class A, color at the Professional's choice.
 - .2 Used at exterior joints where mullions, frames and dissimilar materials meet, and at other locations as shown on the drawings.
- .3 Intermediate butyl rubber sealant:
- .1 Conforms to CAN/CGSB-19.GP-14M, non-sag; colors to be selected from manufacturer's standard series.
 - .2 Used at interior joints where mullions and aluminum frames meet, and at other locations indicated on the drawings.
- .4 Elastomeric bitumen based sealant:
- .1 Aluminum-colored reflective waterproofing coating based on elastomeric bitumen, mineral fillers and solvents. Anticorrosive bituminous coating.
 - .2 Used at the perimeter of roofs and membrane ends, on metal structures such as siding, sheet metal, gutters, pipes, and other areas indicated on the drawings.

- .5 Acoustic sealant (exposed surfaces) :
 - .1 Low odor, mildew resistant acrylic based sealant conforming to ASTM E90 and ASTM C-834
 - .2 Around gypsum board, against metal framing, between metal framing and concrete, under rails and runners, around electrical boxes and other penetrations, in concealed positions, around door frames, and exposed joints; in visible positions or surfaces to be painted or finished.
- .6 Rubber-based acoustic sealant:
 - .1 Conforms to CAN/CGSB-19.21-M87, non-curing, non-peeling, non-staining and consistent, with a penetration of 290-310, as per ASTM D217-94.
 - .2 Around gypsum panels, against metal framing, in concealed position.
- .7 Silicone sealant, mold resistant:
 - .1 One component, CAN/CGSB-19.22 compliant, FDA compliant, colorless, translucent.
 - .2 In general, all interior exposed joints (except where otherwise indicated), between window and door frames and other steel or aluminum work and adjacent interior surfaces, around built-in furnishings, around each element of electrical mechanics and electronic controls on walls and ceilings, around toilet and shower fixtures, for installation of interior glazing.
- .8 Non-sagging polyurethane sealant:
 - .1 Conforms to CAN/CGSB-19.13-M87, ASTM C920-98, grade NS, class 25 and TT-S-00230C, class A, moisture curing.
 - .2 Under aluminum sills and as an adhesive between materials with dissimilar coefficients of expansion.
- .9 Two-component, solvent-free, moisture-insensitive, high modulus, high strength, structural epoxy paste filler/adhesive. Two-component, solvent-free, moisture-insensitive. Tensile strength: 24 Mpa. Elongation at break: 0,95 %.
 - .1 A two-component grouting product.
 - .2 For junctions at the head of concrete block walls and slabs.
- .10 Polyurethane Adhesive Foam Sealant: a CFC-free polymer caulking to fill the gap between aluminum or steel frames and adjacent surfaces (do not expose).

2.3 SUPPORTING MATERIALS

- .1 Primers: of the type recommended by the sealant manufacturer.
- .2 Preformed, compressible and non-compressible joint bottoms.
 - .1 Polyethylene, urethane, neoprene or vinyl foam elements.
 - .1 Extruded cellular foam filler strips.
 - .2 Oversized elements by 30-50%.
 - .2 Synthetic elastomer (neoprene) or butyl rubber elements.
 - .1 Round, solid rods with a Shore A hardness of 70
 - .3 High density foam elements.

- .1 Extruded cellular PVC foam, extruded cellular polyethylene foam with a Shore A hardness of 20 and a tensile strength of 140 to 200 kPa, extruded polyolefin foam with a density of 32 kg/m³, or neoprene, with dimensions recommended by the manufacturer.
- .4 Anti-solidification tape
 - .1 Polyethylene tape that does not adhere to the sealant.

2.4 CLEANING PRODUCTS FOR JOINTS

- .1 Non-corrosive, non-staining cleaning agents that are compatible with joint materials and sealants in accordance with the sealant manufacturer's written recommendations.
- .2 Primer: in accordance with the sealant manufacturer's written recommendations.

PARTIE 3 EXECUTION

3.1 GENERAL

- .1 Verification of Conditions: Before installing joint sealants, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows the work to be performed according to the manufacturer's written instructions.
- .2 Compliance: Comply with manufacturers' written requirements, recommendations and specifications, including any available technical bulletins, instructions for handling, storage and application of products, and data sheet indications.
- .3 Apply sealant materials in accordance with strict manufacturer's recommendations
- .4 Ensure compatibility of substrates with the sealant. Prime surfaces according to manufacturers' recommendations.
- .5 Make and apply the sealing assemblies, where indicated on the drawings, and in particular in the following areas
 - .1 Sealing of exterior joints of openings modified or affected by the work.
 - .2 Sealing of interior joints.
 - .3 Acoustic sealing of partitions.
 - .4 Sealing of the perimeters of fixed furniture and shelves.
 - .5 Sealing of the interior glazing.
 - .6 Finishing seal.
- .6 Waterproofing work shall include all adhesives, anchors, fasteners, moldings, and other accessories necessary for the work described.

3.2 PROTECTION OF THE WORKS

- .1 Protect works installed by third parties from soiling or any other form of contamination.

3.3 SURFACE PREPARATION

- .1 Check the dimensions of the joints to be made and the condition of the surfaces, in order to obtain an adequate width/depth ratio for the application of the jointing compounds and sealants.

- .2 Clear joint surfaces of all undesirable material, including dust, rust, oil, grease and other foreign matter which may affect the quality of workmanship.
- .3 Do not apply sealants to joint surfaces that have been treated with a filler, curing compound, water repellent or any other type of coating, unless prior testing has confirmed the compatibility of these materials. Remove existing coatings from surfaces as required.
- .4 Ensure that joint surfaces are dry and not frozen.
- .5 Prepare surfaces according to manufacturer's instructions.

3.4 APPLICATION OF THE PRIMER

- .1 Before applying primer and caulking, mask adjacent surfaces as necessary to prevent soiling.
- .2 Apply primer to the side surfaces of the joints immediately prior to applying the sealant in accordance with the sealant manufacturer's instructions.

3.5 LAYING OF THE SEALANT

- .1 Apply anti-seize tape where required, in accordance with the manufacturer's instructions.
- .2 Compressing it by approximately 30%, install the joint filler according to the desired joint depth and profile.

3.6 DOSAGE

- .1 Dose the components in strict accordance with the sealant manufacturer's instructions.
- .2 Avoid the formation of air bubbles.

3.7 IMPLEMENTATION

- .1 Application of sealant
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 If necessary, apply masking tape to the edges of the surfaces to be grouted in order to achieve clean joints.
 - .3 Apply sealant in a continuous bead.
 - .4 Apply the sealant with a gun equipped with a nozzle of appropriate size.
 - .5 The supply pressure must be high enough to allow the filling of voids and the perfect sealing of joints.
 - .6 Make joints to form a continuous seal free of edges, folds, sagging, air voids and embedded dirt.
 - .7 Before a skin forms over the joints, shape the exposed surfaces to a slightly concave profile.
 - .8 Remove excess sealant as work progresses and at the end of the job.
- .2 Drying
 - .1 Ensure that sealants are dried and cured in accordance with the sealant manufacturer's instructions.
 - .2 Do not cover joints made with sealants until they have dried thoroughly.

3.8 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.
 - .2 Clean adjacent surfaces immediately.
 - .3 As the work progresses, remove excess and spilled sealant with recommended cleaners.
 - .4 Remove the masking tape at the end of the initial sealant cure period.
- .2 Final Cleanup: Remove excess materials/equipment, waste materials, tools and equipment from the job site in accordance with Section 01 74 11 - Cleanup.
- .3 Waste management: sort waste for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Remove recycling bins and dumpsters from the job site and dispose of materials at the appropriate facilities.

3.9 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by the installation of joint sealants.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 06 10 00 - Carpentry.
- .3 Section 07 21 16 - Batt Insulation.
- .4 Section 07 92 00 - Sealants for joints.
- .5 Section 09 21 16 - Gypsum Board Cladding.
- .6 Section 09 22 16 - Non-supporting metal framing.
- .7 Section 09 91 23 - Interior and exterior painting work.

1.2 CONDITIONS

- .1 All General Terms and Conditions, General Instructions, Supplemental Special Instructions and Addendums are made a part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Specialty Contractor shall provide all materials, equipment, labor and services required for the complete execution of the work of the metal doors and frames so that the work will fully meet its intended purpose.
- .4 Scope of work
 - .1 Supply and installation of a door / frame / hardware elevator #2. (Description of components: see plan).

1.3 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A 653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B 29, Specification for Refined Lead.
 - .3 ASTM B 749 Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181, Zinc-Rich Coating, Organic Prepared.
 - .2 CGSB 41-GP-19Ma, Rigid vinyl profiles for windows and doors.
 - .3 CAN/CGSB-12.11, Wired Safety Glass.
- .4 Canadian Standards Association (CSA)/CSA International
 - .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled Structural Steel.

- .2 CSA W59, Welded Steel Construction (Arc Welding).
- .5 Canadian Steel Door Manufacturers Association (CSDMA)
 - .1 CSDFMA, Specifications for Commercial Steel Doors and Frames.
 - .2 CSDFMA, Recommended Selection and Usage Guide for Commercial Steel Doors.
- .6 National Fire Protection Association (NFPA)
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
 - .3 NFPA 257 - Fire Tests of Window Assemblies.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113, Architectural Coatings.
 - .2 SCAQMD Rule 1168, Adhesives and Sealants Applications.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701, Standard for Polystyrene Thermal Insulation, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702, Standard for Mineral Fiber Thermal Insulation for Buildings.
 - .3 CAN/ULC-S704, Urethane and Isocyanurate Thermal Insulation, Faced Boards.
 - .4 CAN4-S104, Standard Method for Fire Tests of Doors.
 - .5 CAN4-S105M, Standard Specification for Fire Door Frames Meeting the Performance Requirements of CAN4S104-.
- .9 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual.
- .10 Glass Association of North America (GANA)
 - .1 GANA Glazing Manual.
 - .2 GANA Laminated Glazing Reference Manual.

1.4 DESCRIPTION OF THE WORKS

- .1 Design requirements.
- .2 Frames installed in exterior walls shall be designed so that the elements (doors and frames) can expand and contract freely when subjected to surface temperatures ranging from -35 degrees Celsius to 35 degrees Celsius.
- .3 The maximum deflection of steel bay closure elements under a wind load of 1.2 kPa shall not exceed 1/175 of the span.
- .4 Fire Rated Doors and Frames: Certified by an organization accredited by the Standards Council of Canada to the requirements of CAN4-S104M for prescribed or indicated fire ratings and degrees of resistance, and labeled by the organization.
- .5 Approved fire frames shall be provided for openings to be sealed with fire rated components as per the door and frame schedule. Products shall be tested in accordance with CAN4-S104, ASTM E 152 or NFPA 252, certified by a nationally recognized organization providing factory inspection service, and manufactured in accordance with the details set out in the monitoring procedures and

factory inspection manuals published by the certifying agency and provided to the individual manufacturers.

1.5 SAMPLE DOCUMENTS TO BE SUBMITTED FOR APPROVAL INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Submit the required data sheets in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .3 Submit required shop drawings in accordance with Section 01 33 00 - Submittal Documents/Samples.
 - .1 Shop drawings shall show each type of door proposed, nature of materials used, thickness of bare metal, mortise joints, reinforcing hardware, location of exposed anchors and fasteners, openings to receive glazing, louvers, arrangement of hardware, carcass hardware, and fire rating, and finishes.
 - .2 Shop drawings shall show each type of frame proposed, nature of materials used, thickness of bare metal, reinforcing members, glazing beads, location of exposed anchors and fasteners, and types of finish coatings.
 - .3 Shop drawings shall include a door schedule with markings and numbers corresponding to those used on the drawings and door list.
 - .4 Submit test results, technical data and instructions for door installation.
- .4 Submit required samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .5 Submit, as a sample, a 300 mm x 300 mm hinged top corner for each proposed door type, including glass sections.
- .6 Submit one 300 mm x 300 mm corner for each type of frame proposed as a sample.
 - .1 The sample must show a cut-out for a hinge, glazing beads, a 300 mm long mullion connection (removable), the type of reinforcement, the assembly detail of the hardware mortises, the glass assembly and the prescribed finishes.

1.6 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.

1.7 GUARANTEE OF THE WORK

- .1 For the work in this Section 08 11 13 - Hollow Metal Doors and Frames, the 12 month warranty period is extended to five (5) years. Provide a written document, signed and issued on behalf of Canada, guaranteeing steel doors and frames against distortion due to anticipated loading, corrosion, sagging, edge splitting and joint defects for a period of five (5) years from the date of acceptance of the work.
- .2 The warranty shall state that the doors will meet all established performance requirements, under normal use, for the period of time stated.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 The work shall be governed by a **waste management plan** in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. The work in this section shall be performed in accordance with the requirements of that plan.

PARTIE 2 Products

2.1 GENERAL

- .1 Unless otherwise specified, install fire doors and frames bearing the appropriate certification label in accordance with NFPA 80.
- .2 The work includes, but is not limited to, the supply and installation of the following:
 - .1 Steel doors and frames as shown on the architectural plans.
 - .2 Preparation of doors and frames to receive hardware, glazing and paint.
 - .3 The supply and installation of the aluminum door grille according to the indications on the plans.
 - .4 Supply of all steel frames for interior doors and supply and installation of all steel doors shown on the plans.
 - .5 All adhesives, anchors, fasteners, moldings, and other accessories required for the installation of metal doors and frames.

2.2 MATERIALS AND EQUIPMENT

- .1 Hot-dipped galvanized steel sheet: conforms to ASTM A653 M, with ZF75 zinc plating; minimum bare metal thickness conforms to CSDFMA Standard, Table 1 - Thickness for Component Parts.
- .2 Reinforcing parts: steel conforming to CSA-G40.20/G40.21, grade 44W, zinc plated ZF75 according to ASTM A 653M.

2.3 DOORS AND FRAMES

- .1 Soul of the doors:
 - .1 Honeycombed soul
 - .1 Honeycomb core with a maximum mesh size of 24.5 mm, made of Kraft paper with a minimum mass of 36.3 kg per ream and a minimum density of 16.5 kg/m, sanded to the required thickness.
- .2 Doors:
 - .1 Interior doors
 - .1 Heavy-duty steel interior doors with 150mm vertical Z-braces, with or without ULC approval according to the door and frame schedule
 - .2 Door with honeycomb core;
 - .3 Base metal thickness: 1.6mm (18 gauge);
 - .4 Door thickness: 45mm.
 - .5 Fire resistance: ULC 1 hour

- .2 The core of all doors installed in the project shall contain no added urea formaldehyde resin.
- .3 Install the required reinforcements for the hardware described in the plan, in steel of 3.4mm thickness minimum.
- .3 Racks (frames) :
 - .1 Type frames for interior doors
 - .1 Three (3) piece heavy duty commercial grade galvanized steel interior frames;
 - .2 The interior of the frames must be insulated with mineral wool;
 - .3 Base metal thickness: 1.9mm (16 gauge)
 - .4 Fire resistance: ULC 1 hour
- .4 Door Grille:
 - .1 Aluminum door grill - 1 hour fire resistance (fuse)

2.4 ADHESIVES

- .1 Honeycomb cores and steel elements: heat resistant, sprayable contact adhesive based on neoprene rubber (polychloroprene) with incorporated resin filler, low viscosity.
 - .1 Adhesives: VOC content not to exceed 50 g/L as per SCAQMD regulation number 1168.
- .2 Polystyrene and polyurethane cores: low viscosity, epoxy resin based, heat resistant contact adhesive.
- .3 Staple Joint Doors: High viscosity, polychloroprene based, fire resistant adhesive/sealant with embedded resin filler.

2.5 PRIMARY PAINT

- .1 Rustproofing touch-up paint conforming to CAN/CGSB-1.181 standard.
 - .1 VOC content of no more than 50 g/L according to GS-03.
 - .2 All doors and frames must be primed.

2.6 PAINT

- .1 Steel doors and frames shall be field painted in accordance with Section 09 91 23 - Interior and Exterior Painting Work prior to installation of hardware. Touch-ups shall be made as required thereafter. No hardware shall be coated with paint. Weatherstripping shall not be coated with paint. Finished surfaces shall be free of scratches or other imperfections.
 - .1 VOC content of no more than 50 g/L according to SCAQMD regulation number 1113.

2.7 ACCESSORIES

- .1 Door dampers: single stud, neoprene rubber.
- .2 Metal filler: according to manufacturer's specifications.
- .3 Fire approval labels: fixed with 2 metal rivets.
- .4 Sealant: as specified in section 07 92 00 - Sealants for joints.
- .5 Reinforcements and stiffeners :

- .1 Horizontal, top and bottom of doors: Steel profiles, continuous U-shaped, 1.9 mm thick;
- .2 Vertical, at door edges: Steel profiles, continuous in U shape, 1.2 mm thick;
- .3 Other reinforcements: As shown on the diagrams included in the appendix at the end of this section, each reinforcement having a minimum of six (6) weld points.

2.8 FABRICATION OF FRAMES - GENERAL

- .1 Frames shall be manufactured in accordance with CSDMA standards.
- .2 The frames shall be manufactured according to the maximum frontal dimensions and the indicated profiles, as indicated on the door and frame schedule with welded mitered corners.
- .3 Frames shall be cut, reinforced, drilled and tapped as required to accommodate mortised and jiggled hardware and required electronic equipment using templates provided by the finish hardware supplier. Frames shall be reinforced to accommodate the hardware.
- .4 Manufacture custom frames specifically for hardware requirements. No prefabricated frames with pre-punched plates (knock-out plates) will be accepted.
- .5 Protect the mortises with steel protection boxes.
 - .1 Provide protective (clean) enclosures of sufficient size to allow installation of the dust cover provided with the lock strike.
- .6 Strengthen the buildings as follows:
 - .1 Place a reinforcement piece on the lintel of frames that are wider than 1220 mm.
 - .2 Reinforce the head of the 1220 mm and less wide frames installed in the masonry by means of a 38 x 38 x 6 angle welded inside the frame
- .7 Single leaf door frames shall have three dampers and double leaf door frames shall have two dampers installed on the top rail.
- .8 No manufacturer's identification plates shall be affixed to frames and signs.
- .9 Unless otherwise specified, fasteners shall be concealed.
- .10 Double the frames that will receive continuous hinges over their entire height with continuous metal plates of 3 mm thick welded and prepared to receive the hardware.
- .11 The frames should be touched up with primer where the zinc coating has been damaged during manufacture.
- .12 Insulation of the exterior frames: see details on the plans.

2.9 ANCHORING OF BUILDINGS

- .1 Appropriate devices for securing frames to walls and floors shall be provided and installed.
 - .1 Ground anchoring: 14 gauge steel U-plates - no visible screws
 - .2 For welded frames:
 - .1 Interior drywall: 18 gauge steel internal support for attachment to studs
 - .2 Exterior walls: anchor designed to stiffen the jamb, 18 gauge steel. See details on plans
- .2 Wall anchors must be installed immediately above or below each hinge reinforcement on the hinge side jamb, and directly opposite on the casement jamb.

- .3 Studs with rebate heights of 1520 mm or less shall be provided with 2 anchors; an additional anchor shall be provided for each additional 760 mm segment or portion thereof.

2.10 WELDED FRAMES

- .1 Welds shall be made in accordance with CSA W59.
- .2 The frame elements must be assembled with precision, mechanically or by mitre, and then be solidly welded to each other, with the weld being applied to the inner wall of the profiles.
- .3 The butt joints between the mullion, transom and center rail elements as well as the sills and supports must be precisely counter-profiled.
- .4 Joints and welded corners should be ground to a flat surface, filled with metal filler and then sanded to a smooth, uniform finish.
- .5 Floor anchors must be securely fastened to the inside of each stud.
- .6 Two temporary spacers should be welded to each frame to keep them straight during transport. These temporary spacers must be removed before installation and replaced with spacers of the exact length required.

2.11 DOOR MANUFACTURING - GENERAL

- .1 Doors shall be flat, swinging and have an opening to accommodate glazing or louvers as indicated on the plans and door schedules.
- .2 Unless otherwise specified, exterior steel doors shall be of the insulated core type. Interior steel doors shall be of the honeycomb core type pressure bonded to the face sheets.
- .3 The longitudinal edges of the doors shall be welded. The longitudinal joint shall be ground to a flat surface, filled with metal filler and sanded to a smooth, uniform finish.
- .4 Doors shall be of special construction, tested and/or designed to be part of a fully operable assembly consisting of door, frame, seals and hardware in accordance with the requirements of ASTM E 330.
- .5 Doors shall be cut, reinforced and tapped as required to accommodate the necessary mortised and gauged hardware and electronic equipment.
- .6 Openings equal to or greater than 12.7 mm in diameter shall be factory drilled, except those for mounting bolts and through bolts, which shall be field drilled at the time of hardware installation.
- .7 Doors shall be reinforced where hardware is to be mounted in a projecting position. Exterior doors shall be equipped with a flush steel closing profile at the top. Interior doors shall be provided with a flush, spot-welded, inverted profile at the top and bottom.
- .8 Doors should be touched up with primer where the zinc coating has been damaged during manufacture.
- .9 Fire doors shall be provided for openings to be sealed with fire rated components as listed in the door and frame schedule. Products shall be tested in accordance with CAN4-S104, ASTM E 152 or NFPA 252, certified by a nationally recognized organization providing factory inspection service, and manufactured in accordance with the details set out in the monitoring procedures and factory inspection manuals published by the certifying agency and provided to the individual manufacturers.

- .10 Fixed panels adjacent and/or transom to fire doors must have the same composition and fire resistance as the door and have the same approval indications.
- .11 No manufacturer's identification plates shall be affixed to the visible parts of the doors.
- .12 Doors to be continuously hinged shall be lined on the edges with a continuous 3 mm thick metal plate, concealed and welded throughout and prepared to receive hardware.

2.12 HONEYCOMBED CORE DOORS

- .1 Interior doors shall consist of steel face sheets of thickness as specified, with a honeycomb core pressure bonded to the face sheets.

2.13 HOLLOW CORE DOORS

- .1 Interior doors shall be constructed of steel facing sheets of thickness as specified.
- .2 Doors shall be provided with vertical braces securely welded to each face sheet at not more than 150 mm centres.
- .3 As specified, the gaps between the interior door reinforcements shall be filled with fiberglass, honeycomb material, or a material providing a thermal protection rating as required by the agencies providing the certification label.

2.14 DOORS AND FRAMES WITH THERMAL BREAK

- .1 Thermal break doors shall have an insulated core, and the exterior elements shall be separated from the interior elements by a continuous mechanically stapled break.
- .2 The thermal break shall be made by extruded rigid PVC elements conforming to CGSB 41-GP-19Ma.
- .3 Thermal break frames shall have a continuous mechanically stapled break to isolate the exterior elements from the interior elements.
- .4 Frames and doors must be insulated.

PARTIE 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations and specifications, including any available technical bulletins, product handling, storage and application instructions, and data sheet indications.

3.2 INSTALLATION - GENERAL

- .1 Unless otherwise specified, install fire doors and frames bearing the appropriate certification label in accordance with NFPA 80.
- .2 Install doors and frames in accordance with the CSDFMA installation guide.
- .3 Preparation of the support
 - .1 Where doors are to be installed, level the concrete slab prior to installation of the steel doors and frames; smooth out unevenness in the substrate and other defects with a substrate filler.

3.3 INSTALLATION OF THE FRAMES

- .1 Install components plumb, square, level and at the proper height.
- .2 Attach anchors to adjacent building components.
- .3 Hold the frames firmly in position with braces until they are installed. Install temporary wood braces horizontally one-third of the way across the opening to maintain a constant width of the frames. Install a vertical brace under the top rail in the center of the opening when the opening is wider than 1200 mm. Remove the wooden spacers once the frames are in place.
- .4 Leave the necessary clearances for bending to prevent the loads exerted by the structure from being transmitted to the frames.
- .5 Fill the frames with acoustic insulation before attaching them to the metal studs. Caulk around the frames between the frames and adjacent elements.
- .6 Ensure continuity of the vapour barrier at exterior door frames
- .7 Demonstrate to the owner's representative the plumbness and straightness of the buildings and take steps to maintain them. Failure to do so may result in corrective action at a later stage of the project as determined by the owner's representative.
- .8 For all steel frames and hardware (sills etc.) in contact with the floor, apply a clear silicone bead at the junction of the frame and hardware with the floor covering (or with the concrete slab if there is no covering).

3.4 INSTALLATION OF THE DOORS

- .1 Install doors and hardware using the templates provided, in accordance with the manufacturer's instructions and the requirements of Section 08 71 00 - Door Hardware.
- .2 Provide uniform spacing between the doors and the frame jambs and between the doors and the finished floor (and threshold) as follows:
 - .1 Hinge side: 1.0 mm.
 - .2 Latch and lintel side: 1.5 mm.
- .3 Finished floor, non-combustible threshold and sill strip: 12 mm.
- .4 Adjust moving parts to ensure smooth operation of doors.
- .5 Adjust moving parts to ensure smooth operation of doors.
- .6 Install louvers, if applicable

3.5 EXECUTION OF THE RETOUCHING

- .1 Touch up with primer any surfaces that have been damaged during installation.
- .2 Cover the exposed surface of the frame anchors and any imperfections with metal filler, then sand to a smooth, uniform finish.

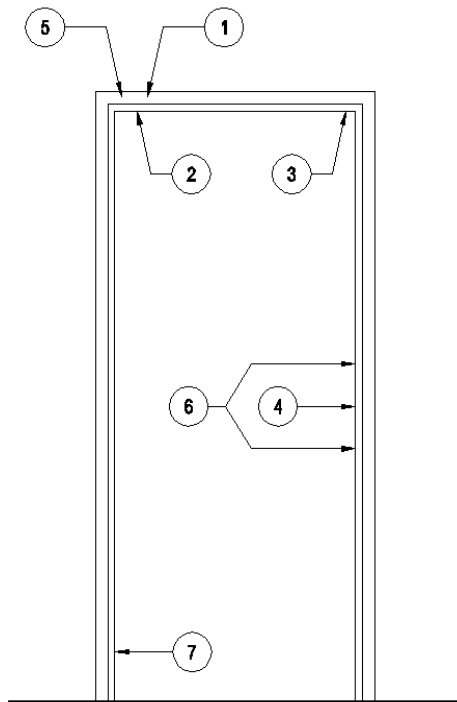
3.6 GLAZING INSTALLATION

- .1 Install door glazing in dry rebate with adhesive strips according to the manufacturer's recommendations.

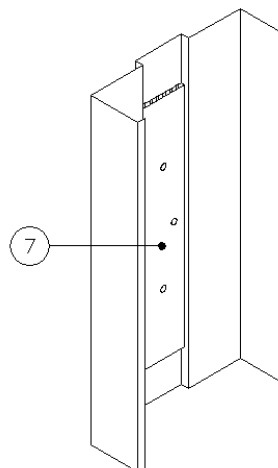
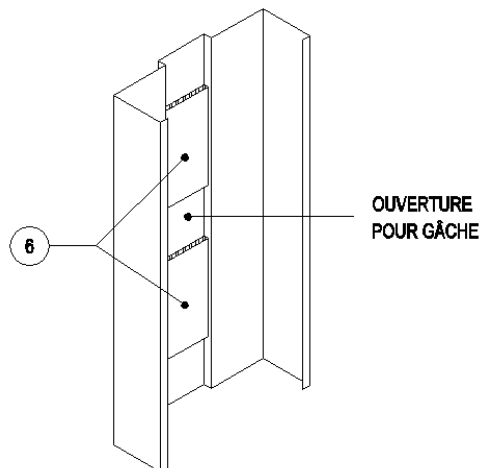
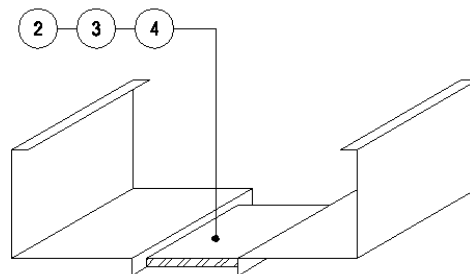
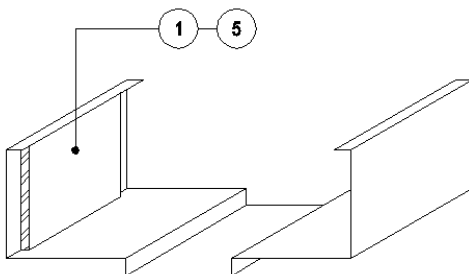
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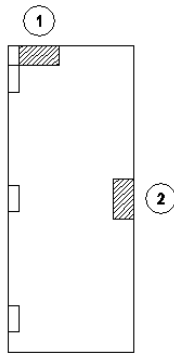
DOOR ADJUSTMENT

- .1 Prior to completion of construction, readjust doors and hardware to ensure proper and smooth operation.

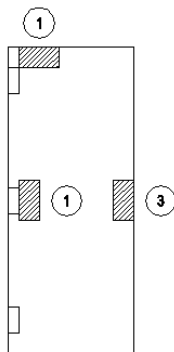
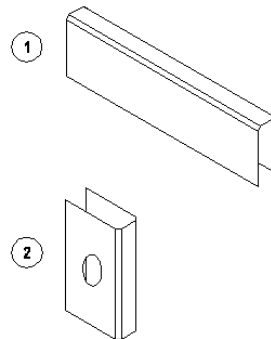


- 1 RENFORT POUR BRAS DE FERME-PORTE
PERPENDICULAIRE AU CADRE 12" X 1 1/2" X 1/8"
(305 mm X 38 mm X 3 mm)
- 2 RENFORT POUR BRAS DE FERME-PORTE
PARALLÈLE AU CADRE 12" X 1 1/2" X 1/8"
(305 mm X 38 mm X 3 mm)
- 3 RENFORT POUR TIGE VERTICALE DE
BARRE-PANIQUE 12" X 1 1/2" X 1/8"
(305 mm X 38 mm X 3 mm)
- 4 RENFORT POUR GACHE DE BARRE-PANIQUE
EN SURFACE 12" X 1 1/2" X 1/8"
(305 mm X 38 mm X 3 mm)
- 5 RENFORT POUR PIVOT 12" X 1 1/2" X 1/8"
(305 mm X 38 mm X 3 mm)
- 6 RENFORT POUR GACHE STANDARD
2 3/4" X 1 1/2" X 1/8"
(70 mm X 38 mm X 3 mm)
- 7 RENFORT POUR CHARNIÈRES
7 3/8" X 1 1/2" X 1/8"
(187 mm X 38 mm X 3 mm)

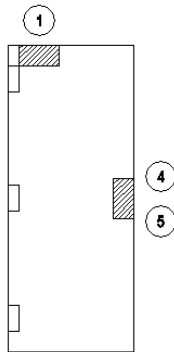
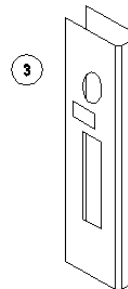




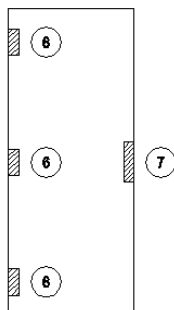
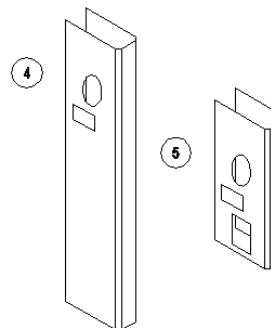
- 1 RENFORT POUR FERME-PORTE
15" X 4" X 1 5/8", CALIBRE 14
(381 X 102 mm X 41 mm, ÉP. 1.9 mm)
- 2 RENFORT POUR SERRURE CYLINDRIQUE
7 1/2" X 4 1/8" X 1 5/8", CALIBRE 14
(190 mm X 105 mm X 41 mm, ÉP. 1.9mm)



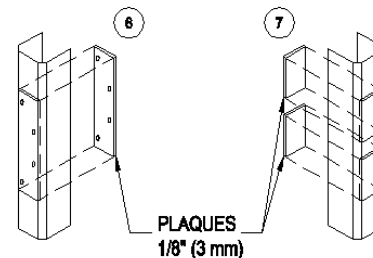
- 1 RENFORT POUR FERME-PORTE
15" X 4" X 1 5/8", CALIBRE 14
(381 X 102 mm X 41 mm, ÉP. 1.9 mm)
- 3 RENFORT AVEC CLIPS POUR BARRE-PANIQUE
18 1/2" X 4 1/8" X 1 5/8", CALIBRE 14
(419 mm X 105 mm X 41 mm, ÉP. 1.9mm)

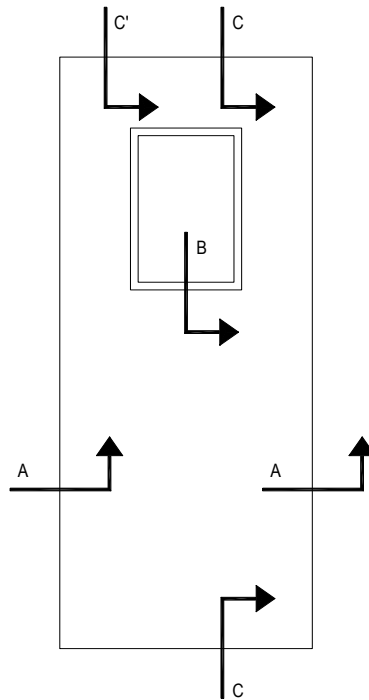


- 1 RENFORT POUR FERME-PORTE
15" X 4" X 1 5/8", CALIBRE 14
(381 X 102 mm X 41 mm, ÉP. 1.9 mm)
- 4 RENFORT AVEC CLIPS POUR SERRURE MORTE
ET PLAQUES À POUSSER ET À TIRER
18" X 4 1/2" X 1 5/8", CALIBRE 14
(483 mm X 114 mm X 41 mm, ÉP. 1.9mm)
- 5 RENFORT AVEC CLIPS POUR SERRURE À MORTAISE
9 1/2" X 4 1/8" X 1 5/8", CALIBRE 14
(241 mm X 105 mm X 41 mm, ÉP. 1.9mm)

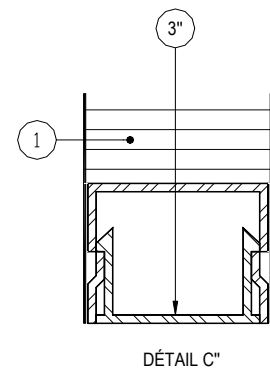
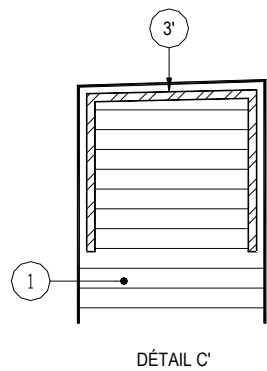
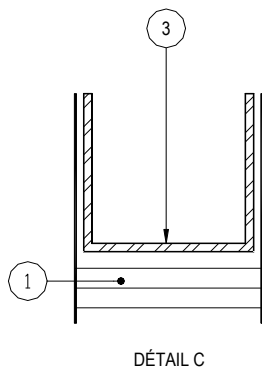
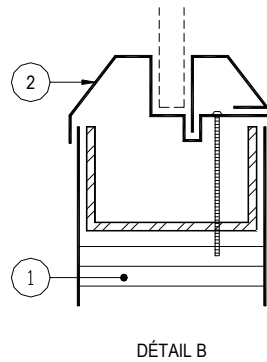
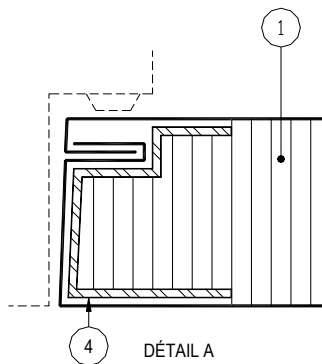


- 6 RENFORT DE CHARNIÈRE STANDARD:
FER EN "U" CONTINU ÉP. 18
AVEC PLAQUE DE 4 1/2" X 1" X 1/8"
(114 mm X 25 mm X 3 mm)
- 7 RENFORT DE TETIERE STANDARD
FER EN "U" CONTINU ÉP. 18
AVEC PLAQUES DE 2 3/4" X 1" X 1/8"
(70 mm X 25 mm X 3 mm)

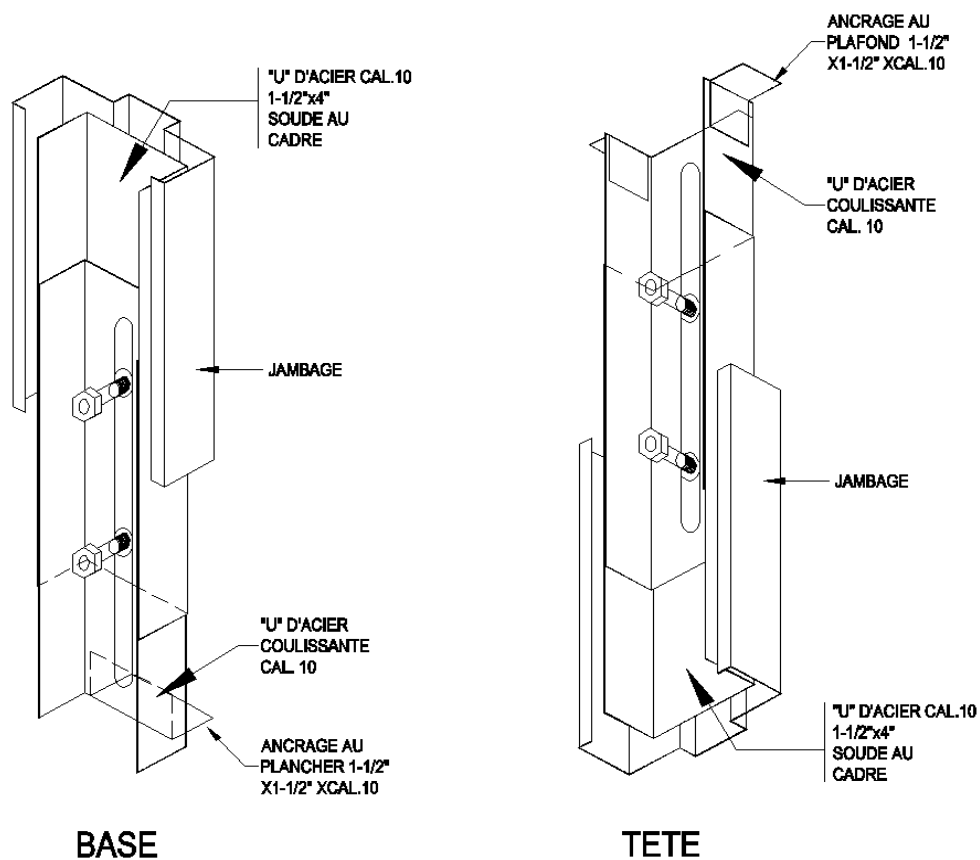




- ① ÂME ALVÉOLÉE POUR PORTE INTÉRIEURE
OU ÂME ISOLÉE POUR PORTE EXTÉRIEURE
- ② MOULURE STANDARD POUR VERRE 1/4" (6 mm)
OU VERRE ISOLANT SELON BORDÉREAU
- ③ FER EN "U" CALIBRE 14 (1.9 mm)
POUR HAUT ET BAS DE PORTE
- ③' FER EN "U" CALIBRE 14 (1.9 mm)
POUR HAUT DE PORTE EXTÉRIEURE
- ③" EXTRUSION D'ALUMINIUM POUR
BAS DE PORTE EXTÉRIEURE
- ④ FER EN "U" CALIBRE 18 (1.2 mm) POUR
CÔTÉ SERRURE ET CÔTÉ CHARNIÈRES



SUPPORT AJUSTABLE



END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 06 10 00 - Carpentry.
- .3 Section 08 11 13 - Metal Doors and Frames.

1.2 CONDITIONS

- .1 All General Terms and Conditions, General Instructions, Supplemental Special Instructions and Addendums are made a part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the door finish hardware work in such a manner that the work will fully accomplish its intended purpose.

1.3 REFERENCES

- .1 Work governed by this section shall comply with the applicable sections, of the most recent version or revision, of the standards, codes and regulations listed below.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)/Association canadienne des fabricants de portes d'acier (ACFPA)
 - .1 CSDMA/ACFPA, Recommended Dimensional Standards for Commercial Steel Doors and Frames.
- .3 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2, Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.3, Exit Devices.
 - .4 ANSI/BHMA A156.4, Door Controls - Closers.
 - .5 ANSI/BHMA A156.5, Auxiliary Locks and Associated Products.
 - .6 ANSI/BHMA A156.6, Architectural Door Trim.
 - .7 ANSI/BHMA A156.8, Door Controls - Overhead Stops and Holders.
 - .8 ANSI/BHMA A156.10, Power Operated Pedestrian Doors.
 - .9 ANSI/BHMA A156.12, Interconnected Locks and Latches.
 - .10 ANSI/BHMA A156.13, Mortise Locks and Latches Series 1000.
 - .11 ANSI/BHMA A156.14, Sliding and Folding Door Hardware.
 - .12 ANSI/BHMA A156.15, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .13 ANSI/BHMA A156.16, Auxiliary Hardware.

- .14 ANSI/BHMA A156.17, Self-closing Hinges and Pivots.
- .15 ANSI/BHMA A156.18, Materials and Finishes.
- .16 ANSI/BHMA A156.19, Power Assist and Low Energy Power - Operated Doors.
- .17 ANSI/BHMA A156.20, Strap and Tee Hinges and Hasps.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Documents / Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for door hardware. Data sheets shall include product specifications, performance criteria, dimensions, limitations and finish.
- .3 Samples
 - .1 Submit a sample of each type of hardware item for review and acceptance.
 - .2 Samples shall be submitted to the Specialty Contractor for incorporation into the work.
 - .3 Label each sample with the corresponding paragraph of the specification, the number and trademark, finish and lot number of the hardware items.
 - .4 Once the samples are approved, they will be given to the Specialty Contractor to incorporate into the work.
- .4 List of hardware items
 - .1 Submit a list of door hardware items.
 - .2 The list shall include the prescribed hardware items and indicate the make, model, material, function and finish, as well as any other pertinent information.
- .5 Test Reports: Submit test reports certifying that the products and materials / equipment comply with the physical and performance requirements.
- .6 Manufacturer's Instructions: Submit the installation instructions provided by the manufacturer.

1.5 DOCUMENTS/ELEMENTS TO BE SUBMITTED UPON COMPLETION OF WORK

- .1 Additional materials/materials
 - .1 Provide replacement/maintenance materials and equipment as required in accordance with Section 01 78 00 - Documents/Items to be Delivered upon Completion.
 - .2 Tools
 - .1 Provide (2) two sets of keys required to service door closers, locks and all other hardware with locked access for servicing.

1.6 QUALITY ASSURANCE

- .1 Requirements of regulatory agencies
 - .1 Hardware for exterior exit doors (exit doors) and for doors mounted in firewalls must be certified by a Canadian certification organization accredited by the Standards Council of Canada.

- .2 Certificates: Submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical and performance requirements.

1.7 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which shall be labeled with the name and address of the manufacturer.
- .3 Pack hardware items, including fasteners, separately or in groups of similar items, and label each package according to the nature and purpose of the item.
- .4 Storage and handling
 - .1 Store materials and equipment off the floor indoors in a clean, dry, well-ventilated area according to the manufacturer's recommendations.
 - .2 Store door hardware in a manner that protects it from marks, scratches and scuffs.
 - .3 Protect finished surfaces with protective wrapping or peelable film.
 - .4 Replace damaged materials and equipment with new materials and equipment.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 The work shall be governed by a **waste management plan** in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. The work in this section shall be performed in accordance with the requirements of that plan.

1.9 WARRANTY OF THE WORK

- .1 For work in this Section 08 71 00 - Door Hardware, the legal warranty period of 12 months is extended to 24 months. Provide a certificate to this effect.
- .2 Hardware supplied under this section shall be warranted against defects in material or workmanship not attributable to normal wear and tear for a period of two (2) years from final acceptance of the work, except for door closers which shall be warranted for a period of five (5) years and mechanical panic locks for three (3) years. Electrified hardware will be guaranteed for a period of two (2) years.

1.10 ACCEPTABLE MATERIALS OR PRODUCTS

- .1 Where materials or products are specified by their brand name, refer to the Instructions to Tenderers for procedures for requesting approval of substitute materials or products.

PARTIE 2 PRODUCTS

2.1 GENERAL

- .1 All items of the same type must come from the same manufacturer.
- .2 Check pressure differentials between rooms and ensure that door closers have the required power to operate properly.
- .3 The work in this section includes, but is not limited to, the furnishing and installation of the following:

- .1 All architectural hardware for interior steel doors;
- .2 All adhesives, anchors, fasteners, moldings, and other accessories required for the work in this section;
- .3 The entire key system;

2.2 DOOR HARDWARE

- .1 Refer to the notes on the plans for the hardware list.
- .2 For equivalency purposes, only certified hardware items that meet ANSI/BHMA standards are acceptable for this project. Approved equivalencies (upon full proof of equivalency) may be filed for all products listed below.
- .3 Use ULC listed hardware for fire doors and exit doors.
- .4 All electrified hardware shall conform to CAN/ULC-S533 and shall have a ULC or WHI certificate for fire performance.
- .5 Use only products from one manufacturer for parts of the same nature.

2.3 FASTENERS

- .1 Only fasteners supplied by the manufacturer may be used. Failure to comply with this requirement may jeopardize warranties and invalidate certification labels, if applicable.
- .2 Provide screws, bolts, expansion plugs and other fastening devices necessary for satisfactory attachment and proper operation of hardware.
- .3 Exposed fasteners shall have the same finish as the hardware.
- .4 Stainless steel fasteners shall be made of stainless steel.
- .5 Where a pull handle is required on one side and a push plate on the other side of the doors, provide the necessary fasteners and install them so that the handle is secured through the door. Install the plate so as to conceal the fasteners.
- .6 Use fasteners made of a material compatible with the material they pass through.
- .7 Unless otherwise specified, use Phillips head countersunk screws to attach push-on and foot plates, etc.

2.4 KEYS

- .1 All keys, including master keys for new doors, are part of the contract and must be provided by the manufacturer and forwarded directly to the Department Representative in clearly marked envelopes.
- .2 Key system:
 - .1 Keys and key groups will be secured and shaped to meet the specifications of each federal building group.
 - .2 All cylinders and cores shall be Medeco type as specified by the hardware groups.
 - .3 The key system must be subject to the existing master key system. Schedule necessary meetings to establish the key system and submit the key list for approval.
 - .4 Engrave key code numbers on keys and lock barrels.

- .5 Provide the Department Representative with the cut codes and technical specifications of the key charters created. The Specialty Contractor shall also provide the new key chart upon completion of the work.
- .6 Provide 6 copies of new master keys and 6 copies of each new sub-master key. For all other new keys, provide 3 keys per lock.
- .3 Locks will be subject to a temporary key system or temporary barrels during the time of construction. Provide:
 - .1 1 construction key system for all locks with 10 copies of the construction key.
 - .2 Complete, adequate and surface-matched fasteners for each specified hardware item, such as door closers, doorstops, pull handles, etc.

2.5 HARDWARE GROUP (see plans)

PARTIE 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations and specifications, including technical bulletins and installation instructions specified in product catalogs and on packaging cartons, as well as data sheet indications.
- .2 Provide metal door and frame manufacturers with installation templates and complete instructions to prepare their products for the hardware items specified in this section.
- .3 Provide manufacturer's installation instructions with each hardware item.

3.2 INSTALLATION

- .1 Install hardware in standard positions as required by the Canadian Metric Guide for Steel Doors and Frames (Modular Construction), developed by the Canadian Steel Door Manufacturers Association.
- .2 Coordinate with the security system supplier for proper installation of electrified hardware (electric strike, etc.), including empty conduit lines as detailed on the electrical drawings.
- .3 If the installation is such that the stop will touch the handle, install the stop so that it touches the bottom of the handle.
- .4 Use only the fasteners provided by the manufacturer. Failure to do so may jeopardize warranties and invalidate certification buckets. Quick release devices, unless specifically provided by the manufacturer, will not be accepted.
- .5 When requested by the Department Representative, remove the temporary rotors from the locks and replace them with permanent rotors, then verify the operation of all locks.

3.3 SETTING

- .1 Check and adjust each piece of hardware on each door and ensure normal operation.
- .2 Check all keys and master keys and replace defective keys and cylinders.
- .3 Check door closers after pressurization and final balancing of building systems is completed.
- .4 Adjust hardware, operating devices and closers for smooth operation, security and tightness of closure.

- .5 Lubricate hardware, operating and control devices and all moving parts.
- .6 Replace items that cannot be adjusted and lubricated to function normally.

3.4 CLEANING

- .1 Once the installation is complete, clean up the site to remove accumulated dirt and debris from the construction and the environment.
- .2 Clean hardware with a damp cloth and a non-abrasive cleaner and polish according to the manufacturer's instructions.
- .3 Remove protective film from hardware items, if applicable.
- .4 Upon completion of installation work, remove excess materials, scrap materials, tools and safety barriers from the site.

3.5 DEMONSTRATION

- .1 Information to be given to maintenance staff:
 - .1 Provide maintenance personnel with the necessary information on the following.
 - .1 Proper methods of cleaning and maintaining hardware items.
 - .2 The characteristics, function, handling and storage of keys.
 - .3 Function, handling and storage of keys used to adjust door closers, locks, exit door hardware.
- .2 Demonstrate the operation of the components, as well as the adjustment and lubrication characteristics.

3.6 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by the installation of door hardware.

END OF SECTION

PART 1 GENERAL INFORMATION

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 07 92 00 - Sealants for joints.
- .3 Section 09 22 16 - Non-load-bearing metal framing.
- .4 Section 09 91 23 - Interior painting work.
- .5 Division 26 - Electricity.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the panelized cladding work and all gypsum work so that the work will fully accomplish its intended purpose.

1.3 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM C475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C840-08, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .6 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C1280-99, Standard Specification for Application of Gypsum Sheathing.

- .9 ASTM C1177/C1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .10 ASTM C1178/C1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .11 ASTM C1396/C1396M-09a, Standard Specification for Gypsum Wallboard.
- .3 Association of the Wall and Ceilings Industries International (AWCI)
 - .1 AWCI Levels of Gypsum Board Finish-97.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86 (R1988), Polyethylene Vapour Barriers for Buildings.
 - .2 CAN/CGSB-71.25-M88, Adhesive for Bonding Prefabricated Panels to Wood Framing and Metal Studs.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 – Documents / Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for gypsum board products. Data sheets shall include product specifications, performance criteria, dimensions, limitations and finish.
- .3 Samples
 - .1 Submit samples of each type of gypsum board sheathing for review and acceptance.
 - .2 Samples shall be submitted to the Specialty Contractor for incorporation into the work.
 - .3 Submit two (2) 300 mm x 300 mm samples of vinyl-faced gypsum board and samples of corner braces and flush mouldings vinyl mouldings chaperone mouldings textured finish insulating strips 300 mm in length.
- .4 Documents/Samples to be submitted for sustainable design.
 - .1 LEED Canada NC Version 1.0 CI Version 1.0 Submittals: per Section 01 35 21 - LEED Requirements.
 - .2 Construction waste management
 - .1 Submit the construction waste management plan waste reduction plan developed for the project, which must specify recycling and recovery requirements.

- .2 Submit calculations for end-of-project recycling rates, recovery rates, and landfill detour rates, which must demonstrate that 50% of construction waste was actually diverted from landfill.
- .3 Recycled content (recycled content)
 - .1 Provide a list of recycled content products to be used, with details of the required percentage of recycled content, which shall include the cost of these products and their percentage of post-consumer recycled content (post-industrial materials), as well as the total cost of the recycled content products and materials to be incorporated into the project.
- .4 Regional materials and products: provide evidence that the project incorporates the required 10-20% of regional products and materials/materials, including their cost, the distance from the project location to the furthest extraction or manufacturing location, and the total cost of regional products and materials/materials to be incorporated into the project.
- .5 Low-emitting materials
 - .1 Submit a list of adhesives and sealants, and paints and coatings used in the interior of the building, indicating that these products meet the limits and restrictions on their VOC content and chemical composition.

1.5 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which shall be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store gypsum panel products so they do not rest on the floor indoors in a clean, dry, well-ventilated area in accordance with manufacturer's recommendations.
 - .2 Store gypsum board sheathing in a manner that protects it from marks, scratches and scuffs.
 - .3 Protect them from weather, other materials and damage during construction and other activities.
 - .4 Handle gypsum panel products in a manner that will not damage their surfaces or ends.
 - .5 Protect the surfaces of pre-finished aluminum components with a protective wrap of peelable film. Do not use adhesive papers or spray coatings that are very difficult to remove after exposure to sun or weather.
 - .6 Replace defective or damaged materials and equipment with new materials and equipment.

1.6 ENVIRONMENTAL CONDITIONS

- .1 Maintain ambient air temperature at not less than 10 degrees Celsius and not more than 21 degrees Celsius for 48 hours prior to installation and grouting of gypsum board, during installation and grouting, and for at least 48 hours after completion of joints.
- .2 Install gypsum board and grout on dry, non-frosted surfaces.

- .3 Composite wood and agricultural fiber products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

PARTIE 2 PRODUCTS

2.1 MATERIALS/MATERIALS

- .1 Type X waterproof gypsum board, conforming to ASTM C 1178/C1178M, 16 mm thick or as thick as existing, 1200 mm wide and as long as practical.
- .2 16 mm thick, type x, 1200 mm wide, glass-fiber reinforced gypsum wallboard of the longest possible length. Reference product: CGC DUROCK fiberglass mat wallboard or approved equivalent.
- .3 Metal furring channels, hangers, wires, inserts and anchors: in accordance with manufacturer's recommendations.
- .4 Furring profiles for drywall: made of galvanized steel, with a 0.5 mm thick core, allowing the attachment of plasterboards by means of screws.
- .5 Flexible furring for drywall: in galvanized steel, with a 0.5 mm thick core, allowing a flexible fixing of plasterboards.
- .6 Steel drill screws: conform to ASTM C 954.
- .7 Lamination adhesive: according to the manufacturer's recommendations, asbestos-free.
- .8 Flush moldings, corner braces, shrinkage joints and edges: conform to ASTM C 1047, aluminized metal, 0.5 mm bare thickness, perforated flanges, one piece.
- .9 Sealant: as per the requirements of Section 07 92 00 - Joint Sealants.
- .10 Insulating strips: rubberized, waterproof, open cell neoprene, 3 mm thick, 12 mm wide, with one side coated with a permanent self-adhesive, of appropriate length.
- .11 Joint compound: ASTM C 475 compliant, asbestos free
- .12 Satin aluminum finish molding for partitions that ends on aluminum frames. Color at the choice of the Professional.
- .13 Moulding for gypsum board expansion joints: zinc sheet, 44 mm wide and 13 mm deep, conforms to ASTM C1047.

PARTIE 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Prior to installation of gypsum board sheathing, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and permits work to be performed in accordance with the manufacturer's written instructions.
 - .1 Perform a visual inspection of the surfaces/substrates in the presence of the Construction Manager.
 - .2 Immediately notify the Construction Manager of any unacceptable conditions found.

- .3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Construction Manager.

3.2 MOUNTING

- .1 Unless otherwise specified, install and finish gypsum board sheathing in accordance with ASTM C840.
- .2 Install coatings in accordance with ASTM C1280.
- .3 Unless otherwise specified, attach hangers and support channels for suspended gypsum board ceilings in accordance with ASTM C840.
- .4 Secure fixtures to the ceiling by means of additional hangers placed not more than 150 mm from the corners of the fixture and not more than 600 mm all around.
- .5 Install the elements level, the permissible deviation being 1:1200.
- .6 Frame openings for access panels, light fixtures, diffusers, grilles with furring strips.
- .7 Install 19 mm x 64 mm furring channels along the entire runner at the exact location of the top of the metal-framed partitions.
- .8 Install furrings for attachment of gypsum wallboard for vertical partitions to the suspended ceiling or to the actual ceiling, as required.
- .9 Unless otherwise specified, install wall furring for attachment of gypsum board in accordance with ASTM C840.
- .10 Install furring around building openings and around built-in equipment, cabinets, access panels. Extend furring into cheeks. Consult with equipment suppliers regarding clearances and clearances required.
- .11 Where indicated, install furring around ductwork, beams, columns, piping or any exposed utility components.
- .12 Install flexible furring perpendicular to joist columns between plasterboard thicknesses at maximum 600 mm centers and maximum 150 mm from ceiling/wall junction. Fasten at each support with standard 38 mm long nails and 25 mm long drywall screws.
- .13 Install a continuous 150 mm high strip cut from 12.7 mm thick gypsum board at the base of each partition mounted on flexible furring.
- .14 Unless otherwise specified, gypsum partitions shall be erected to the underside of the structure with sealant applied above and below as indicated.
- .15 Carefully cut the gypsum to fit the profile of the metal deck.
- .16 Coordinate work with other Sections for integral items such as door frames, light fixtures and other electrical or mechanical services, access doors, service panels, fire cabinet, accessories, etc., and for air and smoke sealing, etc. See details. Provide adequate support for these items.
- .17 Where fire resistance is required on the drawings or by code requirements, provide assemblies with materials that comply with ASTM E119 and CAN/ULC-S101 and shall be acceptable to authorities having jurisdiction.
- .18 Obtain approval from the Professional for the location of expansion or control joints prior to commencing work.

3.3 POSE

- .1 Do not install gypsum board until all holding frames, anchors, shims, acoustical insulation materials, and electrical and mechanical installations have been approved.
- .2 Attach one (1) or two (2) layers of gypsum board to furring or metal framing with screw anchors, stud adhesive for the first layer, laminating adhesive and screw anchors for the second layer. Install screws at a maximum of 300 mm centers.
 - .1 Single layer coating
 - .1 Install gypsum board on ceiling first, then cover walls with gypsum board as per ASTM C840.
 - .2 Lay the plates vertically or horizontally, depending on the direction that will give the fewest possible joints.
- .3 Install waterproof gypsum board throughout the project.
- .4 Apply a continuous 12 mm diameter bead of fire-retardant sealant around the perimeter of each fire rated partition wall. Seal all cut-outs around electrical boxes, conduits, in partitions with acoustic sealant around the perimeter.
- .5 Install gypsum board vertically on walls to eliminate butt joints. Except in areas where local codes or fire-rated assemblies require vertical installation, in stairwells and other areas with large wall areas, boards shall be installed horizontally with butt joints staggered on studs.
- .6 Install the plates with the facing side facing out.
- .7 Do not install damaged or wet gypsum board.
- .8 Place butt joints on supporting members. Stagger the vertical joints on different studs on each side of the wall.

3.4 INSTALLATION

- .1 Mount accessories square, plumb or level, and securely fasten them in place. Use full-length pieces where possible. Make joints tight, aligned and securely fastened. Miter corners and fit them perfectly, leaving no rough or uneven edges. Fasten elements with contact cement applied along their entire length at 150 mm centres.
- .2 Install flush moldings around suspended ceilings.
- .3 Install flush moldings where gypsum board meets uncovered surfaces and at various locations as indicated. Seal joints with sealant.
- .4 Install continuous insulation strips at the edges of gypsum board and flush moldings where they meet metal window and exterior door frames to prevent thermal bridging.
- .5 Carry out the joints of withdrawal of squares and alignment.
- .6 Enter caps at corners and intersections and attach to each element with three (3) screws.
- .7 Install manholes for electrical and mechanical equipment as specified in the appropriate sections.
 - .1 Securely fasten frames to furring or framing members.
- .8 Finish the joints between the panels and in the inside corners with the following products: joint compound, tape and tape coating. Apply these products according to the manufacturer's recommendations and smooth to match the finish of the panel surface.

- .9 Cover corner moldings, shrinkage joints and, if necessary, trim with two coats of joint compound and one coat of tape coating smoothed and tapered to match the finish of the panel surface.
- .10 Fill depressions left by screw heads with joint compound and tape filler until a smooth surface flush with adjacent gypsum board surfaces is achieved, so that these depressions are invisible after finishing.
- .11 Lightly sand irregular ends and other imperfections. Avoid sanding adjacent surfaces.
- .12 After installation, the work should be smooth, level or plumb, free of corrugations and other defects, and ready to be coated with a finish coat.
- .13 Coat the surface to be textured with a coat of white filler. Allow to dry, then apply the textured finish according to the manufacturer's instructions.
- .14 Mix the joint compound so that it is slightly less consistent than when finishing the joints.
- .15 Apply a thin coat of face coating over the entire surface using a plasterer's trowel or plaster knife to even out surface texture, unevenness and tool marks.
- .16 Allow the facing plaster to dry completely.
- .17 Remove dents by lightly sanding or wiping with a damp cloth.

3.5 ASSEMBLIES WITH FIRE RESISTANCE

- .1 Construct fire rated partitions where indicated to achieve the ratings shown on the drawings. Where references to approved assemblies are indicated, construct partitions in accordance with all details contained in those test reports.
- .2 Follow the requirements of building codes and CAN ULC-S102 for framing openings in fire separations. The supply and installation of firestop support members on both sides of the partitions is included in this section.
- .3 Ensure that where lighting fixtures or accessories are inserted into fire rated partitions, they are provided with walls having equivalent fire resistance to the partition where indicated. Coordinate this work with the Mechanical and Electrical Divisions.

3.6 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.
 - .2 Final Cleanup: Remove excess materials/materials, waste materials, tools and equipment from the site in accordance with Section 01 74 11 - Cleanup.
 - .3 Remove recycling bins and dumpsters from the job site and dispose of materials at the appropriate facilities.

3.7 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by the installation of gypsum board sheathing.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements
- .2 Section 06 10 00 - Carpentry.
- .3 Section 07 21 16 - Batt Insulation.
- .4 Section 07 92 00 - Sealants for joints.
- .5 Section 08 11 13 - Metal Doors and Frames.
- .6 Section 09 21 16 - Gypsum Board Cladding.
- .7 Division 26 - Electrical - Volume 2.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda are an integral part of this section.
- .2 This section shall be read and the drawings pertaining thereto reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall furnish all materials, equipment, labor and services required for the complete execution of the non-load-bearing metal framing work in such a manner that the work will fully accomplish its intended purpose.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C645-11a, Standard Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754-11, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Environmental Choice Program (ECP)
 - .1 DCC-047-98(R2005), Architectural Coatings.
 - .2 DCC-048-95(R2006), Recycled Waterborne Coatings.
- .3 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #26, Primer, Galvanized Metal, Cementitious.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.4 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Documents/Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for metal framing. Data sheets shall include product specifications, performance criteria, dimensions, limitations and finish.
- .3 Product samples
 - .1 Submit two (2) 300 mm long samples of non-load bearing metal framing.

1.5 QUALITY ASSURANCE

- .1 Test Reports: Submit test reports certifying that products, materials and equipment meet the physical and performance requirements.
- .2 Certificates: Submit documents signed by the manufacturer certifying that the products, materials and equipment meet the physical and performance requirements.

1.6 TRANSPORTATION, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which must be labeled with the manufacturer's name and address.
- .3 Storage and handling
 - .1 Store materials and equipment off the floor indoors in a clean, dry, well-ventilated area according to the manufacturer's recommendations.
 - .2 Store metal framing in a manner that protects it from marks, scratches and scuffs.
 - .3 Replace damaged materials and equipment with new materials and equipment.
 - .4 Pre-consumer recycled content must be a minimum of 15%, as defined in LEED INC's MR-4 Recycled Content Credit.
 - .5 Post-consumer recycled content must be a minimum of 50%, as defined in LEED INC's MR-4 Recycled Content Credit.
 - .6 Submit the required documentation in Section 01 35 21 - LEED Requirements.
- .4 Composite wood and agricultural fiber products shall not contain added urea formaldehyde resin. Adhesives used in laminated assemblies containing these products shall not contain urea formaldehyde.

PARTIE 2 PRODUCT

2.1 MATERIALS / MATERIALS

- .1 Non-load-bearing framing composed of metal sections: posts according to the type of wall in compliance with ASTM C 645, made of rolled steel sheet 33 KSI and hot-dipped galvanized, 0.879 mm thick, designed for screwing gypsum board and equipped with knockouts placed at

- 460 mm centres for the passage of service pipes. This framework must not exceed a height of 4.8 m. Above this height, the framework to be used shall be 1.146 mm thick.
- .2 Low sills: in accordance with ASTM C645-87, of appropriate width for the size of the posts, with 32 mm high sills.
 - .3 20-gauge high sills, 50 mm high, width appropriate to the size of the studs, conforming to ASTM C645 standard, with ovalized perforations every 25 mm c/c.
 - .4 U-shaped metal spacers: 12mm X 38mm galvanized steel, 1.4mm thick, to be inserted horizontally in the center of the studs in the notches provided for this purpose.
 - .5 22 mm galvanized steel furring, 20 gauge, for gypsum board.
 - .6 22 gauge galvanized steel furring:
 - .1 Omega Moulding
 - .2 Any other moulding requested on the plans.
 - .7 Screws: type S or S-12, with cylindrical head, for fixing steel studs.
 - .8 Insulating strip under the rails: open and closed cell polyethylene strip, 6 mm thick for exterior walls and 3 mm thick for interior partitions X the width and length of the latter.
 - .9 Metal stiffeners: profiles of 19mm and 38mm X 2mm thick, in cold rolled steel of 1.4mm thick, coated with anti-corrosion paint or according to the details in the plans.
 - .10 Fire and Smoke Barrier Assembly: in accordance with Section 07 84 00 - Fire Protection.
 - .11 Lightweight steel is prohibited for metal framing.

PARTIE 3 EXECUTION

3.1 INSPECTION

- .1 Verification of Conditions: Prior to installation of non-loadbearing metal framing, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and permits work to be performed in accordance with the manufacturer's written instructions.
 - .1 Perform a visual inspection of the surfaces/substrates in the presence of the Construction Manager.
 - .2 Immediately notify the Construction Manager of any unacceptable conditions found.
 - .3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Construction Manager.

3.2 MOUNTING

- .1 Install the rails on the floor and ceiling, aligning them precisely and fastening them at 600 mm centres, at most.
- .2 Install a moisture barrier complex under the lower sabotaged rails of partitions resting on floor slabs.
- .3 Install studs vertically, 400 mm apart and no more than 50 mm from adjacent walls and on each side of openings and corners.

- .1 Fix the posts in the lower rails. Fasten the posts in the perforated top rail, leaving a 25mm gap between the top of the post and the bottom of the rail. Screw in the openings only, do not screw tightly so that the top rail can absorb the deflection of the structure.
- .2 Brace steel studs as required to ensure rigidity of framing in accordance with manufacturer's instructions.
- .4 When installing the metal posts, a maximum installation distance of 1:1000 must be observed.
- .5 Attach the posts to the upper bottom rail by crimping with pop rivets.
- .6 Coordinate the installation of the poles with the installation of the service lines. Install poles so that the openings in the core of the pole are in line with each other.
- .7 Coordinate the installation of columns with the installation of window and door frames and other supports or anchorage devices for structures specified in other sections.
- .8 Double the posts, for the full height of the room, on each side of openings wider than the prescribed post spacing.
 - .1 Space the lined studs 50 mm apart and secure them together with snap fasteners or other approved fastening devices along the framing anchors.
- .9 At openings, install single heavy gauge steel posts as studs.
- .10 Install the rails over the door and window openings and under the window sills and sidelights so that the intermediate posts can be attached.
 - .1 Secure the rails to each end of the posts according to the manufacturer's instructions.
 - .2 Install intermediate posts above and below the openings in the same manner and spacing as the wall framing posts.
- .11 Install frames around all four sides of building openings, built-in equipment, cabinets and access panels. Extend frames into cheeks. Check with equipment suppliers for required clearances.
- .12 Attach 40 mm studs or furring channels between main studs to permit attachment of fixtures and accessories such as sinks, toilets, bathroom accessories and other items including grab bars and towel racks to steel stud framed partitions.
- .13 Install steel studs or furring channels between main studs for attachment of junction boxes and other electrical installation hardware.
- .14 Unless otherwise indicated in the drawings, mount partitions at ceiling height.
- .15 Leave clearance under beams and bearing slabs so that dead loads cannot be transmitted to columns.
 - .1 Install top rails with 50 mm flanges. Make a control joint in the beams by doubling the profiles that compose them according to the indications.
- .16 Install continuous insulation strips to separate the studs from uninsulated surfaces.
- .17 Install two (2) continuous beads of soundproofing sealant on an insulating strip below the posts and rails at the perimeter of the sound attenuating partitions.

3.3 CLEANING

- .1 Cleanup During Work: Perform cleanup in accordance with Section 01 74 11 - Cleanup.
 - .1 Leave the premises clean at the end of each workday.

- .2 Final Cleanup: Remove excess materials/equipment, waste materials, tools and equipment from the job site in accordance with Section 01 74 11 - Cleanup.
- .3 Waste Management: sort waste for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling bins and dumpsters from the job site and dispose of materials at the appropriate facilities.

3.4 PROTECTION

- .1 Protect installed equipment and components from damage during construction.
- .2 Repair damage to adjacent materials and equipment caused by installation of non-load-bearing metal framing.

END OF THE SECTION

PARTIE 1 GENERAL

1.1 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda form part of this section.
- .2 This section shall be read and the drawings relating to it reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall supply and install all materials, equipment, labour and services required for the complete execution of the resilient sheet flooring work in such a manner that the work will fully meet its intended purpose.
- .4 The Contractor is responsible for the preparation of the floor and the levelling of the concrete slabs underlying his work.

1.2 RELATED SECTIONS

- .1 Section 00 08 00 - Special Administrative Clauses.
- .2 Section 01 11 00 - General Instructions.
- .3 Section 01 33 00 - Documents and samples to be submitted.
- .4 Section 01 41 00 - Regulatory Requirements.
- .5 Section 01 45 00 - Quality control.
- .6 Section 01 61 00 - General Product Requirements.
- .7 Section 01 73 00 - Execution of work.
- .8 Section 01 77 00 - Completion of work.
- .9 Section 01 78 00 - Documents/Elements to be submitted upon completion of work.
- .10 Section 09 21 16 - Gypsum Board Sheathing.
- .11 Section 09 91 23 - Painting - Interior Work.
- .12 Division 26 - Electricity

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM F 1303-04(2014), Standard Specification for Sheet Vinyl Floor Covering with Backing.
- .2 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1113-13, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.

1.4 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL / INFORMATION

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit the required technical data sheets and manufacturer's documentation for resilient sheet flooring. The data sheets must include product characteristics, performance criteria, dimensions, limitations and finish.
- .3 Samples
 - .1 Provide two (2) samples of each colour, pattern and type of cladding sheet 300 mm x 300 mm, and two (2) samples of each colour and type of baseboard 300 mm long.
 - .2 Provide a sample showing each of the transitions between the different finishes including the proposed moulding.
 - .3 Submit a 1200 x 1200 on-site sample of each transition from ceramic surfaces to the floor with other floor finishes. Samples must have the required moldings to make the transition.
- .4 Documents/Elements to be submitted upon completion of the work
 - .1 Provide resilient flooring maintenance records and attach to the manual referenced in Section 01 78 00 - Documents / Deliverables at Completion.

1.5 TRANSPORT, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - General Product Requirements.
- .2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which must be labeled with the manufacturer's name and address.
- .3 Storage and handling
 - .1 Store materials and equipment indoors in a clean, dry, well-ventilated area according to the manufacturer's recommendations.
 - .2 Store prescribed materials and equipment in a manner that protects them from marks, scratches and abrasions.
 - .3 Replace damaged materials and equipment (e.g., broken or improperly packed, surface damage to equipment, etc.) with new materials and equipment.
- .4 Manufacturer's products must be stored at a minimum temperature of 13°C (55°F).

1.6 AMBIENT CONDITIONS

- .1 Maintain the ambient temperature in the area of application and the temperature of the substrate to be coated above 20 degrees Celsius for a period of 48 hours prior to installation, throughout the installation process and for 48 hours after completion of the work.
- .2 The Contractor shall ensure that the conditions required at the work site are respected at all times.
- .3 The temperature of the room and the concrete subfloor must be stable and maintained between 18°C and 30°C 48 hours before, during and 48 hours after the installation of the floor covering. It is recommended that the heating, ventilation and air conditioning (HVAC) system be put into operation.

- .4 No floor covering can be placed until the concrete has completed the specified curing period. The usual curing time for normal density concrete is approximately twenty-eight days.
- .5 Ensure that the moisture content and alkalinity of the surfaces to be coated are within the limits recommended by the coating manufacturer. Perform the test to determine the moisture content of the substrate and submit the report to the Professional.
- .6 Installation of the floor covering shall not commence until all other finishing work in the building is completed. The Contractor shall ensure that the work environment remains clean and safe before, during and after the installation of the floor covering.
- .7 Proceed with the installation of the floor covering only after the following tests have been performed:
 - .1 Proceed with the installation of the sheet flooring if the moisture content detected inside the concrete slab is less than 5lb/1000 ft² during a 24 hour period. The contractor for this section shall include in his price, the use of an independent laboratory to perform the following tests:
 - .1 Calcium chloride test according to ASTM F1869 and moisture test according to ASTM F2170, taking into account that the temperature must be 75°F (24°C) ± 10°F (12°C) and 50% ± 10% relative humidity 48 hours before, during and after the test. The percentage of humidity and the PH of the concrete must meet the manufacturer's requirements in order to allow the installation of the floor finish.
 - .2 The installation of the floor covering must begin only after the submission of an inspection report on the relative humidity level of the concrete slabs. The report must show the location of all the soundings taken. In addition, a minimum of 1 sounding per 1000 ft² of concrete slab area for each concrete pour shall be performed.

1.7 MAINTENANCE

- .1 Materials/Alternative materials
 - .1 Provide sheets, baseboards and adhesive for maintenance of resilient flooring as per Section 01 78 00 - Documents/Deliverables at Completion.
 - .2 Provide 10 square meters of sheeting of each color, pattern and type required to maintain the works in good condition.
 - .3 Additional materials and equipment supplied must be in one piece and from the same production batch as the sheets being installed.
 - .4 Identify each roll of coating and each container of adhesive.
 - .5 Deliver them to the representative of the School Board upon completion of the work covered by this section.
 - .6 Store them at the location indicated by the School Board representative.

1.8 GUARANTEE

- .1 The manufacturer's current warranty is increased to 5 years.

1.9 QUALITY STANDARDS

- .1 The installer must have performed installations of the same size within the last three (3) years.
- .2 The installer must be recognized and approved by the resilient sheet flooring manufacturer.

- .3 Install a 4 m² mock-up of each color, pattern and type of sheet flooring and their respective baseboards following the same procedures and using the same materials as for the actual installation of the floor covering. This must be acceptable to the Professional prior to final installation.

1.10 REQUEST FOR EQUIVALENCE

- .1 Refer to Section 01 61 00 - General Product Requirements, Part 1, Item 1.2.

PARTIE 2 PRODUCTS

2.1 MATERIALS / EQUIPMENT

- .1 Flooring in rolls; inlaid heterogeneous sheet, Armstrong corlon type.
 - .1 Thickness: 2 mm (0.07 mm wear layer)
 - .2 Width: 1830 mm
 - .3 Color:
 - .1 2 colors to be chosen by the Departmental Representative according to the manufacturer's standard colors.
 - .4 Acceptable products :
 - .1 Approved equivalent product
 - .5 Baseboard (floor/riser junction)
 - .1 Colour: Matching the colour of the last riser
 - .2 Type and model: See point 2.1.3 of this section
 - .6 Anti-slip tape - Stair nosing
 - .1 Color: Black
- .2 Flexible skirtings: continuous, supported on the floor covering, with end pieces and pre-moulded protruding angles.
 - .1 Model: Carved Baseboard, profile 1, 6 mm thick from Armstrong
 - .2 Type : Vinyl
 - .3 Height: 114 mm. (Unless otherwise indicated)
 - .4 Length: in lengths of at least 1200 mm.
 - .5 Color: at the option of the Department Representative within the manufacturer's standard color range.
 - .6 See exact location on plans
 - .7 Acceptable products :
 - .1 Approved equivalent products.
- .3 Primers and adhesives: recommended by the resilient flooring manufacturer, compatible with the substrate, whether it is at, above or below floor level.
 - .1 Adhesives for sheet flooring
 - .1 Adhesive: VOC content not to exceed 60 g/L as per SCAQMD regulation number 1168.
 - .2 Baseboard Adhesives

- .1 Adhesive: VOC content not to exceed 50 g/L as per SCAQMD regulation number 1168.
- .4 Levelling plaster for floor covering substrates for concrete surfaces (Surface preparation):
 - .1 High strength, accelerated cure, self-smoothing cementitious patching compound and underlayment such as Mapei Novoplan 2 Plus or equivalent approved by the Professional. For leveling, smoothing and repairing interior concrete slabs.
 - .2 The product used shall have at least the following characteristics
 - .1 Compressive strength: 25 MPa.
 - .2 Tensile strength: 2 MPa.
 - .3 Flexural strength: 7 MPa.
 - .3 The plaster must be able to be applied in layers of no more than 25 mm thickness, and must be applied to the desired thickness using a calibrated squeegee and smoothed out.
 - .4 The coating should be ready to receive the subsequent topcoat 24 to 72 hours after application, depending on the thickness of the application and the manufacturer's recommendation.
 - .5 Primer: Mapei - Primer L or approved equivalent.
- .5 Primers and waxes: of the type recommended by the flooring manufacturer for compatibility with the material and location.
 - .1 Sealant: VOC content not to exceed 100g/L as per SCAQMD regulation number 1113.

2.2 SPECIFIED PRODUCTS

- .1 The products specified (model and manufacturer) above represent a minimum of quality, texture and finish. Higher quality products with the same texture and finish as the specified products may be presented as equivalent products under the conditions of article 1.10.1.

PARTIE 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations and specifications, including any available technical bulletins, handling, storage and application instructions, maintenance instructions and data sheets.

3.2 VERIFICATION OF THE CONDITIONS OF IMPLEMENTATION

- .1 Using the flooring manufacturer's recommended methods, ensure that the concrete slab is clean and dry.

3.3 PREPARATORY WORK

- .1 Existing concrete floor surfaces shall be mechanically profiled and prepared by shot blasting, water blasting, scarifying, diamond grinding or other methods approved by the Professional. Refer to ICRI CSP 3 profile for acceptable profile. Refer to plans for location of existing concrete slabs.
- .2 Prime the slab according to the concrete vapour barrier manufacturer's recommendations. Refer to section 07 26 00.1.

- .3 Apply concrete vapour barrier as per manufacturer's recommendations. Refer to section 07 26 00.1.
- .4 Prime the slab in accordance with the manufacturer's recommendations for levelling/smoothing/plastering.
- .5 Apply levelling compound (Surface Preparation) in accordance with the manufacturer's recommendations, to all concrete floor surfaces on which resilient sheet flooring is to be installed. Ensure that cracks up to 3mm wide are filled and protrusions over 0.8mm are smoothed out. Do not allow any traffic until the product has cured and dried.
- .6 Allow the smoothing/ levelling compound to dry for a minimum of 72 hours after application, prior to the installation of resilient flooring, as recommended by the manufacturer of the smoothing/ levelling compound.
- .7 Prime and seal the concrete slab according to the resilient flooring manufacturer's written instructions.
- .8 Surface preparation for existing plywood floors:
 - .1 After dismantling the existing floor finish, sand the surfaces with mechanical equipment without removing a layer of wood to release the existing adhesive from the plywood surface.
 - .2 Inspect plywood for support, check panel anchorage and reinforce loose anchors as necessary. Install additional anchors where support appears deficient.
 - .3 Fill cracks and joints with resurfacing compound.
 - .4 Re-inspect with the Departmental Representative before installing the floor finish.

3.4 LAYING THE SHEETING

- .1 Provide a high rate of ventilation, with maximum fresh air supply, throughout the installation and for a period of 48 to 72 hours after completion. Ventilate as much as possible directly to the outside. Avoid recirculation of contaminated air through any part of the distribution system or the entire system. Provide additional ventilation for a period of at least one month after the building is occupied.
- .2 Apply the adhesive compatible with the resurfacing product evenly with the recommended trowel. Avoid spreading adhesive over too large an area so that initial setting does not occur before the floor covering is installed.
- .3 Install flooring with joints parallel to the building lines to minimize the number of joints. The width of the pieces laid close to the walls should not be less than one third of the full width of the sheet.
- .4 Lay the sheets in the direction of traffic. To make the joints, overlap the two sheets that are to be joined, cut the two thicknesses simultaneously and then continuously heat seal according to the manufacturer's written instructions.
- .5 Heat-weld the joints of the linoleum sheets according to the manufacturer's written instructions.
- .6 As the work progresses, and immediately after installation, pass a cylinder weighing at least 45 kg over the floor covering to ensure perfect adhesion.
- .7 Cut out the floor covering around the fixed objects.
- .8 Place decorative strips and mark them in the indicated places. Make tight joints.
- .9 Place a piece of flooring on the floor access panel. Observe the pattern of the flooring.
- .10 Extend the floor covering over the surfaces intended to receive the built-in furniture.

- .11 Extend the floor covering on surfaces intended to receive movable partitions; make sure to respect the pattern.
- .12 At doorways, interrupt the flooring below the cross axis of the door where the type, finish or colour of the flooring is different in adjoining rooms.
- .13 Install metal curbs where the edges of the flooring are exposed or unprotected.
- .14 Make transitions between finishing materials as detailed in the plans.
- .15 The installation of the floor coverings of this lot shall take into account the mechanical/electrical elements on the floor (outlets, monuments, etc.) with respect to the cut-outs for the installation. For this purpose the Contractor shall consult the mechanical/electrical drawings.

3.5 BASEBOARD INSTALLATION

- .1 Install the baseboards so that there are as few joints as possible.
- .2 Clean the substrate and prime it with a coat of adhesive.
- .3 Install preformed cove moldings and end caps according to manufacturer's recommendations and plan details.
- .4 Apply adhesive to the back of the baseboard.
- .5 Secure the baseboards to the wall and floor with a 3 kg hand cylinder.
- .6 The skirting boards must be aligned and level, the maximum permissible deviation being 1:1000.
- .7 Cut baseboards to fit door frames and other obstructions. Where door frames are recessed, install pre-molded end pieces.
- .8 At inside corners, make lap joints. Use pre-molded corner pieces for projecting corners that are square. Use pre-molded straight sections to form protruding corners that are not square.
- .9 Heat weld the baseboards according to the manufacturer's written instructions.
- .10 Make transitions between finishing materials as detailed in the plans.

3.6 ON-SITE QUALITY CONTROL

- .1 On-site checks by the manufacturer
 - .1 The manufacturer shall make recommendations for the use of the product(s) and carry out periodic visits to verify that the implementation has been carried out in accordance with his recommendations.

3.7 CLEANING

- .1 Cleaning during the course of the work: carry out the cleaning work in accordance with the additional general conditions.

3.8 PROTECTION OF FINISHED SURFACES

- .1 Protect the flooring of newly coated floors from the time the adhesive sets after the initial waxing until the final waxing of the final inspection.
- .2 Do not allow any traffic on the coated floors for 48 hours after the floor has been installed.
- .3 In the case of linoleum flooring, use only water-based coatings.

END OF SECTION

PARTIE 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 01 - General Requirements.
- .2 Section 08 11 13 - Metal Doors and Frames.
- .3 Section 09 21 16 - Gypsum Board Sheathing.

1.2 CONDITIONS

- .1 All General Conditions, General Instructions, Supplemental Special Instructions and Addenda form part of this section.
- .2 This section shall be read and the drawings relating to it reviewed in conjunction with sections and drawings describing work that is supplementary, subordinate, preliminary or otherwise related to the work described.
- .3 The Trade Contractor shall provide all materials, equipment, labour and services required for the complete execution of the painting - new interior work in such a way that the work will fully meet its intended purpose.
- .4 Scope of work: see plans.

1.3 REFERENCES

- .1 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2004.
- .4 National Fire Code of Canada - 1995
- .5 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.
- .7 Green Seal Environmental standards
 - .1 Standard GS-11, Paints.
 - .2 Standard GC-03, Anti-Corrosive Paints
- .8 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.36, General Purpose Interior Varnishes.

- .2 CAN/CGSB-1.38, Interior Enamel Primer.
- .3 CAN/CGSB 1.212, Paint for Priming Steel.
- .4 CAN/CGSB-1.57, Interior Semi-Gloss Alkyd Enamel Paint.
- .5 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
- .6 CAN/CGSB-1.100, Interior Latex Flat Paint.
- .7 CAN/CGSB-1.118, Interior Alkyd Matt Finish Paint.
- .8 CAN/CGSB-1.119, Interior Wall Primer.
- .9 CAN/CGSB-1.188, Emulsion Type Primer for Masonry Blocks.
- .10 CAN/CGSB-1.195, Semi-Gloss Latex Paint, Interior.
- .11 CAN/CGSB-1.202, Interior Alkyd Enamel, Low Gloss
- .12 CAN/CGSB-1.209, Interior Latex Paint, Low Gloss
- .13 CAN/CGSB-85.100, Painting.

1.4 QUALITY ASSURANCE

- .1 Qualifications
 - .1 The Trade Contractor must be able to demonstrate a minimum of five (5) years experience in performing similar work. Provide a list of the last three (3) comparable projects with the name and location of the project, the contracting authority responsible for the specifications and the name of the project manager.
 - .2 Painting work must be carried out by qualified workers holding a "Tradesman's Certificate of Competence".
 - .3 Apprentices may also be hired provided they work under the direct supervision of a skilled worker in accordance with the regulations governing that trade.
- .2 Health and safety
 - .1 Take appropriate construction health and safety measures in accordance with Section 01 35 29.06 - Health and Safety.
- .3 Sustainable Development Requirements for Construction: as per Section 01 47 15 - Sustainable Development - Construction.
- .4 Sustainable Development Requirements for Control: as per Section 01 47 17 - Sustainable Development - Control.

1.5 DOCUMENTS / SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.
- .2 Technical data sheets
 - .1 Submit the technical data sheets and instructions required for each type of paint or coating used in the coating.
 - .2 Submit the required data sheets for the application or use of paint thinner.
 - .3 Submit two (2) Material Safety Data Sheets (MSDS) required under the Workplace Hazardous Materials Information System (WHMIS), which must comply with WHMIS, as

per Section 01 33 00 - Submittals and Samples. The sheets must indicate the VOC emission rate of the products during application and curing.

1.6 MAINTENANCE

- .1 Alternative materials and products
 - .1 Provide replacement materials and products from the same production lots as those used. Cover them with protective packaging, properly marked with appropriate labels and in accordance with Section 01 78 00 - Documents/Deliverables at Completion.
 - .2 Quantity: Provide one (1) four (4) one (1) litre container of each colour and product type for primer or topcoat stain. Mark the paint and coating containers by associating each colour and product type used with the accepted paint and coating nomenclature, further specifying the colours selected for the various products.
 - .3 Transportation, Storage and Protection: Comply with the Construction Manager's requirements for the transportation and storage of materials and substitutes.

1.7 TRANSPORT, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading
 - .1 Pack, ship, handle and unload materials and products in accordance with Section 01 61 00 - General Product Requirements and the manufacturer's written instructions.
- .2 Acceptance of materials and products
 - .1 Identify paint and coating products, materials and products used with labels indicating the following
 - .1 The name and address of the manufacturer;
 - .2 The type of paint or coating;
 - .3 Compliance with relevant standards or requirements;
 - .4 The color number, according to the specified color list.
- .3 Remove damaged, open or rejected materials and products from the site.
- .4 Storage and protection
 - .1 Provide a safe, dry, temperature-controlled storage area and maintain it properly.
 - .2 Store materials and products away from heat sources.
 - .3 Store materials and products in a well-ventilated area with a temperature between 7 degrees Celsius and 30 degrees Celsius.
- .5 The storage temperature of heat-sensitive products should never be lower than the minimum temperature recommended by the manufacturer.
- .6 Keep areas used for storage, cleaning and surface preparation clean and tidy. Upon completion of the work, restore these areas to their original state of cleanliness.
- .7 Remove from the storage area only those quantities of product that will be used on the day.
- .8 Fire safety requirements
 - .1 Provide one (1) 9 kg dry chemical ABC fire extinguisher and place in close proximity to the storage area.

- .2 Place oily rags, waste materials, empty containers and materials subject to spontaneous combustion in sealed, ULC-approved containers and remove these containers from the job site daily.
- .3 Handle, store, use and dispose of flammable and combustible products and materials in accordance with the requirements of the National Fire Code of Canada.

1.8 IMPLEMENTATION CONDITIONS

- .1 Heating, ventilation and lighting
 - .1 Ventilate confined spaces.
 - .2 Provide heating facilities to raise ambient air and substrate temperatures to above 10 degrees Celsius at least 24 hours prior to commencement of work, and to maintain these temperatures during and after completion of the work until surfaces have sufficiently dried and cured.
 - .3 Provide continuous ventilation for seven (7) days after completion of the work.
 - .4 Coordinate the use of the existing ventilation system with the Construction Manager and, if necessary, arrange for its operation during and after the execution of the work.
 - .5 Provide and temporarily install the necessary heating and ventilation equipment if permanent systems cannot be used; if the building's permanent systems cannot meet the minimum requirements, provide and install the additional equipment required to meet the minimum requirements.
 - .6 Provide the required lighting equipment and maintain a minimum illumination level of 323 lux on the surfaces to be painted.
- .2 Ambient temperature, relative humidity and moisture content of the substrate
 - .1 Unless prior written approval is obtained from the agency responsible for preparing the specifications, the appropriate paint inspection agency and the manufacturer of the coating product used, do not proceed with painting under the conditions listed below:
 - .1 The ambient air and substrate temperatures are below 10 degrees Celsius.
 - .2 Substrate temperature is above 32 degrees Celsius, unless the paint formulation to be applied is designed for application at elevated temperatures.
 - .3 Ambient air and substrate temperatures are not within the range recommended by the MPI or the paint manufacturer.
 - .4 The relative humidity is less than 85% or the dew point is more than 3 degrees Celsius between the air temperature and the substrate temperature. The paint product must not be applied if the difference between the dew point and the ambient or substrate temperature is greater than 3 degrees Celsius. The relative humidity must therefore be determined with a psychrometer before the start of the application.
 - .5 It is raining, snowing, foggy or drizzling, or precipitation in the form of snow or rain is expected before the paint is completely dry.
 - .6 Environmental conditions during the drying or curing of the applied product or coating shall be within the specified ranges until the newly applied coating can withstand the prevailing climatic conditions.
 - .2 Apply the paint coating in a manner that ensures compliance with the following substrate conditions and maximum moisture content:

- .1 Cure period of at least 28 days for new concrete or masonry surfaces;
 - .2 Maximum moisture content of 15% for wood;
 - .3 Maximum moisture content of 12% for gypsum boards and plasters.
- .3 Perform moisture content tests on substrates using a properly calibrated electronic moisture meter. In the case of concrete floors, assess the moisture content by a simple "reference surface coverage test".
- .4 Test plaster, concrete and masonry surfaces for alkalinity.
- .3 Surface condition and processing conditions
 - .1 Apply paint only in areas where the quality of the finished surfaces will not be affected by airborne dust from construction activities or by windblown dust from the ventilation system.
 - .2 Apply paints and coatings to properly prepared surfaces with a moisture content within the specified range.
 - .3 Apply the paint when the previous coat is dry or sufficiently hardened.
- .4 Additional Requirements for the Application of Paint or Coating to Interior Surfaces
 - .1 Apply paint products when the temperature at the work site can be maintained within the limits recommended by the manufacturer of the products used.
 - .2 In occupied buildings, all painting shall be done after hours. The schedule of work shall be approved by the Construction Manager and shall allow sufficient drying and curing time before the return of occupants.

PARTIE 2 PRODUCTS

2.1 MATERIALS

- .1 Materials and Resources: consistent with Section 01 47 15 - Sustainable Development - Construction.
- .2 The paint products and coatings listed in the MPI Approved Products List may be used in this work.
- .3 All products in the selected paint system must be from the same manufacturer.
- .4 Only registered products with an E2 E3 Environmental Choice rating may be used in this work.
- .5 Comply with the latest MPI requirements for interior paint coatings, including those for surface preparation and application of primer or sealant.
- .6 The products used, i.e. primers or sealers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc., must be listed in the MPI Architectural Painting Specification Manual.
- .7 The paint products used must meet the requirements for the MPI E3 E2 E1 Environmental Choice rating based on volatile organic compound (VOC) content as determined by Environmental Protection Agency (EPA) Method 24.
- .8 Specify products on the MPI Approved Products List with at least an E2 E3 rating to meet indoor air quality requirements, including odour, where applicable.
- .9 Paints, coatings, adhesives, solvents, cleaning products, lubricants and other products used must have the following characteristics:

- .1 Water-soluble products that can be washed out with water;
- .2 Non-flammable biodegradable products;
- .3 Products manufactured without any compounds that contribute to the depletion of ozone in the upper atmosphere;
- .4 Products manufactured without any smog-forming compounds in the lower atmosphere;
- .5 Products do not contain toxic metallic pigments, methylene chloride (dichloromethane) or chlorinated hydrocarbons;
- .6 Products with a recycled content of 50% consumer or industrial waste; products with a recycled content of 20% waste.
- .10 Formulate and prepare water-based coatings that do not contain aromatic solvents, halogenated solvents, formaldehyde, mercury, lead, cadmium, hexavalent chromium or any of their derivatives.
- .11 Flash point: 61.0 degrees Celsius or higher for water-based coatings and recycled water-based coatings.
- .12 The preparation and application of water-based plasters as well as recycled water-based plasters must in no case release :
 - .1 Materials that may generate a biochemical oxygen demand (BOD) greater than 15 mg/L in the undiluted effluent of a production facility that discharges to a natural watercourse or to a wastewater treatment facility that does not provide secondary treatment;
 - .2 Materials that increase the total suspended solids (TSS) to more than 15 mg/L for undiluted effluent discharged to a natural watercourse or to a wastewater treatment facility that does not provide secondary treatment.
- .13 Water-based paints, stains and varnishes and recycled water-based coatings must, as a minimum, meet the requirements of the Environmental Choice Program for the E2 claim.
- .14 Recycled water-based coating products must contain at least 50% post-consumer recycled content.

2.2 COLOURS

- .1 The colours will be at the discretion of the Departmental Representative.
- .2 The list of colours will be based on the selection of three (3) basic colours.
- .3 The colours will be chosen from the full range of colours and shades offered by the manufacturers.
- .4 If particular products are offered in a limited range of colours, the colours of the products actually used will be selected from that limited range.
- .5 In three (3) coat paint systems, the second coat shall be a slightly lighter shade than the top coat to facilitate visual identification of each coat.

2.3 DEGREE OF GLOSS (LUSTER)

- .1 The gloss of the paint is defined as the degree of gloss of the paint used, according to the values shown in the following table:

	Glossy at 60 degrees	85 degree chandelier
Gloss level 1 - matte finish	at most 5	at most 10
Gloss level 2 - velvet	at most 10	from 10 to 35

finish		
Gloss level 3 - eggshell finish	from 10 to 25	from 10 to 35
Gloss level 4 - satin finish	from 20 to 35	at least 35
Gloss level 5 - traditional semi-gloss finish	from 35 to 70	
Gloss level 6 - traditional gloss finish	from 70 to 85	
Gloss level 7 - high gloss finish	more than 85	

- .2 The gloss levels of the painted surfaces shall be in accordance with the nomenclature of surface finishes as indicated.

2.4 INTERIOR PAINT SYSTEMS

- .1 Interior Painting System General: Paint interior surfaces according to the requirements of the MPI (Architectural Painting Specification Manual) and/or in accordance with standards approved by the Canada Green Building Council. The INT.6.4P etc. standards described in each system identify the primers required to apply the paint to MPI specifications. For each system listed, the specified products could be replaced by fully equivalent products supplied by the following companies:

- .1 Benjamin Moore.
- .2 Sherwin Williams.
- .3 Sico

- .2 For gypsum and plaster walls: System 1

- .1 One coat of latex primer-sealer and undercoater conforming to CGSB 1.119-2000 and MPI No. 50;
 - .1 Suggested products: Dulux 11000 from ICI Paints or Ecosource 870-130 from Sico, 3.5 mils wet = 1.5 mils dry.
- .2 Two coats of 100% acrylic latex interior paint, velvet finish, conforming to CGSB 1.209-2003 and MPI no. 144 standards.
 - .1 Suggested products: Lifemaster 59311 from Peinture ICI or Ecosource 853-600 from Sico, 2.7 mils wet = 1 mils dry.

- .3 For concrete block and cast concrete walls: System 2

- .1 One coat of pore filler or primer-sealer and latex underlayment conforming to CGSB 1.119-2000 and MPI No. 50;
 - .1 Suggested products: Professional 20056 from ICI Paints or Ecosource 870-130 from Sico, 3.5 mils wet = 1.5 mils dry.
- .2 Two coats of 100% acrylic latex interior paint, velvet finish, conforming to CGSB 1.209-2003 and MPI no. 144 standards.
 - .1 Suggested products: Lifemaster 59311 from ICI Paint or Ecosource 853-600 from Sico, 2.7 mils wet = 1 mils dry; depending on complete sealing of concrete block pores.

- .4 For gypsum board ceilings (including exposed ductwork): System 3

- .1 One coat of latex primer-sealer and undercoater conforming to CGSB 1.119-2000 and MPI No. 50;
 - .1 Suggested products: Dulux 11000 from ICI Paints or Ecosource 870-130 from Sico, 3.5 mils wet = 1.5 mils dry.
- .2 Two coats of 100% acrylic interior latex paint, matte finish, conforming to CGSB 1.100-99 and MPI no. 143.
 - .1 Suggested products: Lifemaster 59111 from Peinture ICI or Ecosource 851-116 from Sico, 3 mils wet = 1.1 mils dry.
- .5 Galvanized metal surfaces (such as steel interior doors): system 4
 - .1 One coat of acrylic latex primer, conforming to MPI No. 134;
 - .1 Suggested products: Devoe Devflex 4020PF from Peintures ICI or Corrostop ultra no. 635-045 from Sico, 3.2 mils wet = 1.7 mils dry
 - .2 Two coats of interior latex paint, semi-gloss finish, conforming to CGSB 1.195-99 and MPI no. 147.
 - .1 Suggested products: Lifemaster 59211 from Peinture ICI or Ecosource 857-6xx from Sico, 2.7 mils wet = 0.9 mils dry.
- .6 Primed ferrous metal surfaces: System 5
 - .1 Two coats of water-based acrylic urethane paint, self-priming, gloss finish;
 - .1 Suggested products: Sico Metalmax Sierra performance no S37, 2.5 mils wet = 1.3 mils dry.
- .7 For existing metals to be painted: system 6
 - .1 Griptec 30 primer from Sico's Rustoleum series.
 - .2 Dry-fall latex spray paint such as Sico Expert 871-140.
- .8 System to be used for exposed copper pipe, fittings and accessories: System 7
 - .1 Clean the surface with Sico acid cleaner no. 771-104, conforming to CAN/CGSB 31-GP-107, type II, rinse with water.
 - .2 One (1) coat of Sico Corrostop metal rust inhibitor primer (280260).
 - .3 Two (2) coats 3 mils dry per coat of interior alkyd paint, semi-gloss finish, conforming to CAN/CGSB 1.57-M90.
- .9 System to be used for electromechanics: System 8
 - .1 Griptec 30 primer from Sico's Rustoleum series.
 - .2 Suggested products: Sico's Metalmax Sierra performance no S37, 2.5 mils wet = 1.3 mils dry per coat.
- .10 Concrete floor system: System 9
 - .1 Two-component, water-based epoxy amine. Benjamin Moore V440-COROTECH or approved equivalents.
 - .2 Application in (2) layers
 - .3 Colors: standard colors to be chosen by the Department Representative for mechanical rooms #1 and #2 and baseboards up on masonry.

- .4 Special colors: for the floor resurfacing of the basement level in front of the elevator landing doors #2: color to match the existing.

2.5 QUALITY CONTROL AT THE SOURCE

- .1 Each batch of post-consumer consolidated recycled material must be tested as follows before the new formulation of the surfacing product is prepared and placed in a container. The tests must be performed by a laboratory or facility accredited by the Standards Council of Canada.
 - .1 Lead, cadmium, and chromium shall be determined by the Inductively Coupled Plasma Emission Spectroscopy (ICPES) method 6010 as defined in EPA SW-846.
 - .2 The mercury content must be determined by the cold vapour atomic absorption spectrometry method, number 7471, as defined in EPA document SW-846.
 - .3 Organochlorine and polychlorinated biphenyls (PCBs) (diphenyls) are to be determined by the gas chromatography (GC) method, number 8081, as defined in EPA SW-846.

PARTIE 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with the manufacturer's recommendations or written instructions, including product bulletins and data sheets, as well as handling, storage and application instructions.

3.2 GENERAL

- .1 Unless otherwise specified, prepare interior surfaces and perform painting in accordance with the MPI Architectural Painting Specifications Manual.
- .2 Apply paint products according to the manufacturer's written instructions.

3.3 INSPECTION

- .1 Inspect existing substrates to determine if their condition will affect the proper preparation of surfaces to be painted or coated. Prior to commencing work, report to the Construction Manager, if any damage, defects, or unsatisfactory or adverse conditions are found.
- .2 Test the moisture content of the surfaces to be painted with a properly calibrated electronic moisture meter; however, the moisture content of concrete floors should be assessed by a simple "reference surface coverage test. Do not begin work until the condition of the substrates is deemed acceptable, within the range recommended by the manufacturer.

3.4 PREPARATORY WORK

- .1 Protection
 - .1 Protect building surfaces and adjoining structures not to be painted or coated from spotting, marking and other damage with non-smearing blankets or coverings. If such surfaces are damaged, clean and restore them as directed by the Construction Manager.
 - .2 Protect permanently attached items, such as fire rating labels on doors and frames.
 - .3 Protect factory-coated materials and components with a finish.
 - .4 To ensure the protection of the general public, pedestrians and building occupants in and around the building.

- .2 Surface preparation
 - .1 Remove cover plates for electrical appliances, light fixtures, surface-mounted hardware on doors, bathroom fixtures and other hardware, and surface-mounted fasteners and fittings before beginning coating work. Identify all items removed and store in a safe place; re-install when painting is complete.
 - .2 If necessary, cover or move furniture and portable equipment to facilitate painting. Replace these items and materials as the work progresses.
 - .3 Post "FRESH PAINT" signs in occupied areas while work is in progress. Signs must be acceptable to the Construction Manager.
- .3 Clean and prepare interior surfaces in accordance with the requirements outlined in the MPI Architectural Painting Specification Manual. Refer to this document for specific requirements in addition to the instructions below.
 - .1 Remove dust, dirt and other foreign matter by wiping surfaces with clean, dry cloths or by sweeping with a compressed air jet and vacuuming.
 - .2 Wash surfaces with biodegradable detergent and bleach, if necessary, and clean hot water, using a stiff-bristled brush to remove dirt, oil and other contaminants.
 - .3 After brushing the surfaces thoroughly, rinse them with clean water until no foreign matter remains.
 - .4 Allow surfaces to drain completely and dry thoroughly.
 - .5 To prepare surfaces for water-based paint, it is recommended to use water-based cleaners rather than organic solvents.
 - .6 Equip hoses with trigger sprayers.
 - .7 Once dry, many water-based paints cannot be removed with water. The use of mineral spirits or organic solvents for cleaning these paints should be minimized.
- .4 Before applying the primer or sealant and between subsequent coats, prevent the cleaned surfaces from becoming contaminated with salts, acids, alkalis, corrosive chemicals, grease, oil and solvents. Apply primer, paint or other pre-treatment products as soon as possible after cleaning, before the surface becomes contaminated again.
- .5 Wherever possible, apply a coat of primer to the concealed surfaces of new woodwork before installation. Use the primers prescribed for exposed surfaces.
 - .1 Apply a vinyl sealer that meets the requirements for MPI product number 36 to knots, gum, sap and resinous surfaces.
 - .2 Fill cracks and nail holes with a filler.
 - .3 Stain the filler before applying it to stained wood.
- .6 Sand and dust surfaces between coats as necessary to ensure proper adhesion of the next coat and to remove any visible defects at a distance of 1000 mm or less.
- .7 Clean metal substrates (surfaces) to be painted of rust, mill scale, welding slag, dirt, oil, grease, and other foreign matter in accordance with MPI requirements. Remove all traces of stripper, then clean corners and recesses of the surfaces with a dry compressed air jet using clean brushes by brushing followed by vacuuming.
- .8 Retouch shop-applied surfaces with the appropriate primer as directed.
- .9 Do not apply paint to prepared surfaces until accepted by the Professional.

3.5 APPLICATION

- .1 The method of application used must be acceptable to the Professional. Apply paint by roller with an airless spray gun or by brush with a high pressure airless spray gun. Unless otherwise specified, apply the product according to the manufacturer's instructions.
- .2 Brush, roller and roller application
 - .1 Apply an even coat of paint with a brush, a brush and/or a roller of the appropriate type.
 - .2 Penetrate the paint into cracks, crevices and corners of the elements.
 - .3 Apply paint with a spray gun, pad or sheepskin to surfaces and corners that cannot be painted with a brush. Use a brush, pad or sheepskin when certain surfaces or corners cannot be painted with a roller.
 - .4 Remove scallops and drips with a brush or roller and rework over the marks left. Roller painted surfaces should be free of roller marks and excess paint.
 - .5 Remove scallops, drips and brush marks from finished surfaces and rework these surfaces.
- .3 Spray application
 - .1 Provide equipment designed for the purpose, capable of spraying the product to be applied and equipped with appropriate pressure regulators and pressure gauges. Maintain this equipment in good condition.
 - .2 During the application of the paint, ensure proper mixing of the ingredients in the container by continuous mechanical agitation or by repeated intermittent agitation as often as necessary.
 - .3 Apply a uniform coat of paint, overlapping the surface covered in the previous pass. Re-roll with a dry roller after the first coat has been applied.
 - .4 Immediately remove drips and scallops with a brush.
 - .5 Use brushes to get paint into cracks, crevices and other hard-to-reach areas with the spray gun.
- .4 Use a pad or sheepskin, or dip only if there is no other way to paint hard-to-reach surfaces.
- .5 Apply each coat of paint in such a way as to obtain a continuous film of uniform thickness. Touch up bare or thinly coated areas before applying the next coat.
- .6 Allow surfaces to dry and cure properly after cleaning and between successive coats, waiting the minimum time recommended by the manufacturer.
- .7 Sand and dust the surfaces between each coat to remove any visible defects.
- .8 Finish surfaces above and below sight lines in accordance with requirements for adjacent surfaces, including areas such as tops of cabinets and closets and projecting edges.
- .9 Finish the interior of cabinets and closets according to the instructions provided for exposed surfaces.
- .10 Finish the alcoves and storage areas according to the directions provided for the adjoining rooms.
- .11 Finish tops, bottoms, edges and openings of doors in accordance with requirements for door faces after doors have been adjusted.

3.6 ELECTRICAL AND MECHANICAL EQUIPMENT

- .1 Unless otherwise specified, apply paint to exposed interior piping, electrical conduits, ventilation ducts, brackets/suspension and other electrical and mechanical components so that the colour and finish of the painted surfaces match those of the adjacent surfaces.
- .2 Boiler rooms and mechanical/electrical rooms: paint piping, electrical ducts, ventilation ducts, brackets/suspensions and other exposed electrical and mechanical components.
- .3 Other unfinished areas: leave piping, electrical conduits, ventilation ducts, brackets/suspensions and other exposed electrical and mechanical components in their original condition, and touch up only scratches and other marks on existing coatings.
- .4 Touch up scratches and marks on factory-applied coatings using the product provided by the equipment manufacturer.
- .5 Do not paint nameplates.
- .6 Do not paint sprinkler heads.
- .7 Apply a primer and a coat of matte black paint to the interior surfaces of the ventilation ducts that can be seen through the grilles, registers and diffusers.
- .8 Paint all the piping in the fire protection system red.
- .9 Apply red enamel paint to the fire alarm and emergency exit lighting system switches.
- .10 Paint all natural gas piping yellow.
- .11 Paint both sides and faces of electrical and telephone service panels prior to installation. Leave equipment in its original condition, except for touch-ups where necessary, and paint conduit, mounting hardware and other unfinished items.
- .12 Do not paint transformers and interior equipment of electrical distribution substations.

3.7 IMPLEMENTATION TOLERANCES

- .1 Walls: no visible defects at a distance of 1000 mm, at an angle of 90 degrees to the surface under examination.
- .2 Ceiling: no defects visible to an observer on the ground at an angle of 45 degrees to the surface being examined, under the intended final lighting.
- .3 The colour and gloss of the topcoat must be uniform over the entire surface under examination.

3.8 ON-SITE QUALITY CONTROL

- .1 Interior decorating and painting/coating work must be inspected by a painting inspection agency (an inspector) recognized by the contracting authority and by the local painting contractors' association. The inspection agency must be notified by the painting contractor at least one week prior to the commencement of the work and must be provided with the paint/coating specifications, plans, elevation drawings (including relevant detail drawings) and bill of materials.
- .2 Interior surfaces to be painted or coated shall be inspected, prior to the commencement of painting or after the application of a primer that has revealed defects in the substrate, by the painting inspection agency who will inform the Construction Manager and the Trade Contractor in writing of the various defects and problems found.
- .3 When using "special" paints, coatings or decorative systems (e.g., elastomeric products) or products or systems not listed in the IPM product list, the manufacturer of the paint or coating used must ensure, as part of their duties, that the products are used in accordance with the IPM. When

applying "special" paints, coatings or decorating systems (e.g. elastomeric products) or products or systems not listed in the IPM product list, the manufacturer of the paint or coating used shall provide, as part of their duties, approval of the existing surfaces and conditions for the application of the particular paint or coating system specified, as well as on-site supervision, inspection and approval of the paint or coating application work, as required, at no additional cost to the Construction Manager

- .4 Quality standard
 - .1 Walls: no visible defects at a distance of 1000 mm, at an angle of 90 degrees to the surface under examination.
 - .2 Ceilings: no defects visible to an observer on the ground at a 45 degree angle to the surface being examined under the intended final lighting.
 - .3 The colour and gloss of the topcoat must be uniform over the entire surface under examination.
- .5 On-site inspection of interior paint work will be performed by a designated independent inspection agency under contract to the Construction Manager.
- .6 Inform the Construction Manager when a surface and product applied on the job site is ready for inspection. Do not apply the next coat until the previous coat has been approved.
- .7 Cooperate with the painting inspection agency and give them access to all areas of the job site.
- .8 Retain purchase slips, invoices and other documents to establish, at the request of the Professional, compliance of the work with the specified IPM requirements.

3.9 SITE RESTORATION

- .1 Clean and reinstall all hardware removed to facilitate painting.
- .2 Remove guards and warning signs as soon as possible after completion of the work.
- .3 Remove spatter from exposed unpainted surfaces. Remove smudges and flecks as work progresses, using a compatible solvent.
- .4 Protect freshly painted surfaces from drips and dust, to the satisfaction of the Construction Manager, and avoid scratching new coatings.
- .5 Return the premises used for storage, mixing and handling of paints and cleaning of tools and equipment used to their original state of cleanliness, to the satisfaction of the Construction Manager.

END OF SECTION

APPENDIX 1

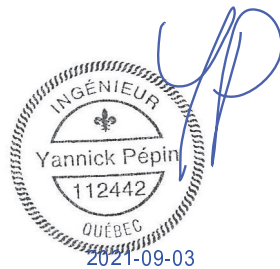
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Yannick Pépin, engineer

Elevator specifications **pgs**

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END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Related Requirements
 - .1 Not Used.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative (2) weeks prior to date of final inspection.
- .2 Departmental Representative: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
 - .1 Verify conditions for demonstration and instructions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure equipment has been inspected and put into operation in accordance with Section 14.
 - .4 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at [scheduled] [agreed upon] times, at the equipment location.
 - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
 - .1 Section 14 - Elevators: 4 hours of instruction spread over several formations

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system (2) weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.4 QUALITY ASSURANCE

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
 - .1 Instruct Departmental Representative personnel.
 - .2 Provide written report that demonstration and instructions have been completed.

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 Includes:
 - .1 This Section specifies roles and responsibilities of Commissioning Training.
- .2 Related Requirements
 - .1 Not Used.

1.2 TRAINEES

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes Property Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.3 INSTRUCTORS

- .1 Departmental Representative will provide:
 - .1 Descriptions of systems.
 - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
 - .1 Start-Up, operation, shut-down of equipment, components and systems.
 - .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
 - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.
- .3 Contractor and equipment manufacturer to provide instruction on:
 - .1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.4 TRAINING OBJECTIVES

- .1 Training to be detailed and duration to ensure:
 - .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
 - .2 Effective on-going inspection, measurements of system performance.
 - .3 Proper preventive maintenance, diagnosis and trouble-shooting.
 - .4 Ability to update documentation.
 - .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.5 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality.
- .2 Training materials to include:
 - .1 "As-Built" Contract Documents.

- .2 Operating Manual.
- .3 Maintenance Manual.
- .4 Management Manual.
- .5 TAB and PV Reports.
- .3 Project Manager, Commissioning Manager and Property Manager will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of detail.
- .5 Supplement training materials:
 - .1 Transparencies for overhead projectors.
 - .2 Multimedia presentations.
 - .3 Manufacturer's training videos.
 - .4 Equipment models.

1.6 SCHEDULING

- .1 Include in Commissioning Schedule time for training.
- .2 Training must be provided during the working hours of the Departmental Representative.
- .3 Training to be completed prior to acceptance of facility.
- .4 Extent of training: estimate length of training required for the equipment or system of elevators in Division 14 according to the following indications:
 - .1 1 general safety trainings of 2 hours each.
 - .2 1 in-depth training for C.R.D Quebec of 2 hours

1.7 RESPONSIBILITIES

- .1 Be responsible for:
 - .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials,
- .2 Departmental Representative will evaluate training and materials.
- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

1.8 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
 - .1 Review of facility and occupancy profile.
 - .2 Functional requirements.
 - .3 System philosophy, limitations of systems and emergency procedures.
 - .4 Review of system layout, equipment, components and controls.
 - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
 - .6 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.
 - .7 Maintenance and servicing.

- .8 Trouble-shooting diagnosis.
- .9 Inter-Action among systems during integrated operation.
- .10 Review of O&M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

1.9 VIDEO-BASED TRAINING

- .1 Manufacturer's videotapes to be used as training tool with Departmental Representative's review and written approval 3 months prior to commencement of scheduled training.
- .2 On-Site training videos:
 - .1 Videotape training sessions for use during future training.
 - .2 To be performed after systems are fully commissioned.
 - .3 Organize into several short modules to permit incorporation of changes.
- .3 Production methods to be professional quality.

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 Includes:
 - .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.
- .2 Related Requirements
 - .1 Not Used
- .3 Acronyms:
 - .1 AFD - Alternate Forms of Delivery, service provider.
 - .2 BMM - Building Management Manual.
 - .3 Cx - Commissioning.
 - .4 EMCS - Energy Monitoring and Control Systems.
 - .5 O&M - Operation and Maintenance.
 - .6 PI - Product Information.
 - .7 PV - Performance Verification.
 - .8 TAB - Testing, Adjusting and Balancing.

1.2 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.
 - .1 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.
 - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.
- .4 AFD managed projects the term Departmental Representative in Cx specifications to be interpreted as AFD Service Provider.

1.3 COMMISSIONING OVERVIEW

- .1 Section 01 91 13.13 - Commissioning (Cx) Plan.
- .2 For Cx responsibilities refer to Section 01 91 13.13 - Commissioning (Cx) Plan.

- .3 Cx to be a line item of Contractor's cost breakdown.
- .4 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .5 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.
- .6 Departmental Representative will issue Interim Acceptance Certificate when:
 - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
 - .2 Equipment, components and systems have been commissioned.
 - .3 O&M training has been completed.

1.4 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 Departmental Representative, 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.

1.5 PRE-CX REVIEW

- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to Departmental Representative.
 - .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.
- .3 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.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Departmental Representative.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

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

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit no later than 4 weeks after award of Contract:
 - .1 Name of Contractor's Cx agent.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
 - .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
 - .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
 - .4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING DOCUMENTATION

- .1 Refer to Section 01 91 13.16 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Departmental Representative to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.19 - Construction Progress Schedules - 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.

1.10 COMMISSIONING MEETINGS

- .1 Convene Cx meetings following project meetings: Section 01 32 16.19 - Construction Progress Schedules - 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.
- .4 At 60% construction completion stage. Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart. Departmental Representative to call a separate Cx scope meeting to review

progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:

- .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
- .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
- .5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .6 Meeting will be chaired by Departmental Representative, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.11 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.

1.12 WITNESSING OF STARTING AND TESTING

- .1 Provide 14 days notice prior to commencement.
- .2 Departmental Representative 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.

1.13 MANUFACTURER'S INVOLVEMENT

- .1 Factory testing: manufacturer to:
 - .1 Coordinate time and location of testing.
 - .2 Provide testing documentation for approval by Departmental Representative.
 - .3 Arrange for Departmental Representative to witness tests.
 - .4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative
 - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
 - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
 - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
 - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
 - .1 Experienced in design, installation and operation of equipment and systems.
 - .2 Ability to interpret test results accurately.
 - .3 To report results in clear, concise, logical manner.

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 Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document require 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 Departmental Representative. 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 Departmental Representative.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
 - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
 - .1 Rejected equipment to be remove from site and replace with new.
 - .2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

- .1 Assemble start-up documentation and submit to Departmental Representative 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 Signed installation/start-up check lists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

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.

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 at least 21 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 INSTRUMENTS / EQUIPMENT

- .1 Submit to Departmental Representative for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
 - .1 2-way radios.
 - .2 Ladders.
 - .3 Equipment as required to complete work.

1.20 COMMISSIONING PERFORMANCE VERIFICATION

- .1 Carry out Cx:
 - .1 Under actual 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.

1.21 WITNESSING COMMISSIONING

- .1 Departmental Representative to witness activities and verify results.

1.22 AUTHORITIES HAVING JURISDICTION

- .1 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.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

1.23 CONSTRAINTS ASSOCIATED WITH COMMISSIONING

- .1 Not Used.

1.24 EXTRAPOLATION OF RESULTS

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.25 EXTENT OF VERIFICATION

- .1 Laboratory areas:
 - .1 Provide manpower and instrumentation to verify up to 100 % of reported results.
- .2 Elsewhere:
 - .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
- .3 Number and location to be at discretion of Departmental Representative.
- .4 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
- .5 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.
- .6 Perform additional commissioning until results are acceptable to Departmental Representative.

1.26 REPEAT VERIFICATIONS

- .1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:
 - .1 Verification of reported results fail to receive Departmental Representative's approval.
 - .2 Repetition of second verification again fails to receive approval.
 - .3 Departmental Representative deems Contractor's request for second verification was premature.

1.27 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.

1.28 DEFICIENCIES, FAULTS, DEFECTS

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

1.29 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 Departmental Representative.

1.30 ACTIVITIES UPON COMPLETION OF COMMISSIONING

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

1.31 TRAINING

- .1 In accordance with Section 01 79 00 - Demonstration and training and 01 79 00.13 – Demonstration and training for building commissioning.

1.32 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

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

1.33 OCCUPANCY

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

1.34 INSTALLED INSTRUMENTATION

- .1 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with Departmental Representative.
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.35 PERFORMANCE VERIFICATION TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
 - .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.36 DEPARTMENTAL REPRESENTATIVE PERFORMANCE TESTING

- .1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

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 Includes:
 - .1 Description of overall structure of Plan and roles and responsibilities of commissioning team.
- .2 Related Requirements
 - .1 Not Used

1.2 REFERENCES

- .1 Public Works and Government Services Canada (PWGSC)
 - .1 PWGSC - Commissioning Guidelines CP.4 -3rd edition-[03].
- .2 Underwriters' Laboratories of Canada (ULC)

1.3 GENERAL

- .1 Provide a fully functional facility:
 - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
 - .2 O&M personnel have been fully trained in aspects of installed systems.
 - .3 Optimized life cycle costs.
 - .4 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
 - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
 - .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
 - .3 Sets out deliverables relating to O&M, process and administration of Cx.
 - .4 Produces a complete functional system prior to issuance of Certificate of Occupancy.
 - .5 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Cx.
 - .2 General description of elements that make up Cx Plan.
 - .3 Process and methodology for successful Cx.
- .4 Acronyms:
 - .1 Cx - Commissioning.
 - .2 BMM - Building Management Manual.
 - .3 EMCS - Energy Monitoring and Control Systems.
 - .4 MSDS - Material Safety Data Sheets.
 - .5 PI - Product Information.
 - .6 PV - Performance Verification.
 - .7 TAB - Testing, Adjusting and Balancing.
 - .8 WHMIS - Workplace Hazardous Materials Information System.

- .5 Commissioning terms used in this Section:
 - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
 - .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.4 DEVELOPMENT OF 100% CX PLAN

- .1 Cx Plan to be 95% completed before added into Project Specifications.
- .2 Cx Plan to be 100% completed within [8]weeks of award of contract to take into account:
 - .1 Approved shop drawings and product data.
 - .2 Approved changes to contract.
 - .3 Contractor's project schedule.
 - .4 Cx schedule.
 - .5 Contractor's, sub-contractor's, suppliers' requirements.
 - .6 Project construction team's and Cx team's requirements.
- .3 Submit completed Cx Plan to Departmental Representative and obtain written approval.

1.5 REFINEMENT OF CX PLAN

- .1 During construction phase, revise, refine and update Cx Plan to include:
 - .1 Changes resulting from Client program modifications.
 - .2 Approved design and construction changes.
- .2 Revise, refine and update every four (4) weeks during construction phase. At each revision, indicate revision number and date.
- .3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.6 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

- .1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
- .2 Project Manager will select Cx Team consisting of following members:
 - .1 PWGSC Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.
 - .2 PWGSC Quality Assurance Commissioning Manager: ensures Cx activities are carried out to ensure delivery of a fully operational project including:
 - .1 Review of Cx documentation from operational perspective.
 - .2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
 - .3 Protection of health, safety and comfort of occupants and O&M personnel.
 - .4 Monitoring of Cx activities, training, development of Cx documentation.
 - .5 Work closely with members of Cx Team.
- .3 Departmental Representative is responsible for:
 - .1 Organizing Cx.
 - .2 Monitoring operations Cx activities.
 - .3 Witnessing, certifying accuracy of reported results.

- .4 Witnessing and certifying TAB and other tests.
- .5 Developing BMM.
- .6 Ensuring implementation of final Cx Plan.
- .7 Performing verification of performance of installed systems and equipment.
- .8 Implementation of Training Plan.
- .4 Construction Team: contractor, sub-contractors, suppliers and support disciplines, is responsible for construction/installation in accordance with contract documents, including:
 - .1 Testing.
 - .2 TAB.
 - .3 Performance of Cx activities.
 - .4 Delivery of training and Cx documentation.
 - .5 Assigning one person as point of contact with Consultant and PWGSC Cx Manager for administrative and coordination purposes.
- .5 Contractor's Cx agent implements specified Cx activities including:
 - .1 Demonstrations.
 - .2 Training.
 - .3 Testing.
 - .4 Preparation, submission of test reports.
- .6 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:
 - .1 Receiving facility.
 - .2 Day-To-Day operation and maintenance of facility.

1.7 CX PARTICIPANTS

- .1 Employ the following Cx participants to verify performance of equipment and systems:
 - .1 Installation contractor/subcontractor:
 - .1 Equipment and systems except as noted.
- .2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
 - .1 To include performance verification.
- .3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.
- .4 Specialist Cx agency:
 - .1 Possessing specialist qualifications and installations providing environments essential to client's program but are outside scope or expertise of Cx specialists on this project.
- .5 Client: responsible for intrusion and access security systems.
- .6 Ensure that Cx participant:
 - .1 Could complete work within scheduled time frame.
 - .2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:
 - .1 Modify ventilation rates to meet changes in off-gassing.
 - .2 Changes to heating or cooling loads beyond scope of EMCS.
 - .3 Changes to EMCS control strategies beyond level of training provided to O&M personnel.
 - .4 Redistribution of electrical services.

- .5 Modifications of fire alarm systems.
- .6 Modifications to voice communications systems.
- .7 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 3 months prior to starting date of Cx for review and approval.

1.8 RISK ASSESSMENT

- .1 Not Used

1.9 EXTENT OF CX

- .1 Cx Structural and Architectural Systems:
 - .1 Architectural and structural:
 - .1 Vertical transportation systems:
 - .1 Elevators 1 and 2.
 - .2 Real-Mode elevator operation testing with fire alarm systems and emergency power.

1.10 DELIVERABLES RELATING TO O&M PERSPECTIVES

- .1 General requirements:
 - .1 Compile English and French documentation.
 - .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:
 - .1 Warranties.
 - .2 Project record documentation.
 - .3 Inventory of spare parts, special tools and maintenance materials.
 - .4 Maintenance Management System (MMS) identification system used.
 - .5 WHMIS information.
 - .6 MSDS data sheets.
 - .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

1.11 DELIVERABLES RELATING TO THE CX PROCESS

- .1 General:
 - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.
- .2 Definitions:
 - .1 Cx as used in this section includes:
 - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
 - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
 - .1 Cx Specifications.
 - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
 - .3 Completed installation checklists (ICL).

- .4 Completed product information (PI) report forms.
 - .5 Completed performance verification (PV) report forms.
 - .6 Results of Performance Verification Tests and Inspections.
 - .7 Description of Cx activities and documentation.
 - .8 Description of Cx of integrated systems and documentation.
 - .9 Tests performed by [Owner/User].
 - .10 Training Plans.
 - .11 Cx Reports.
 - .12 Prescribed activities during warranty period.
- .4 Departmental Representative to witness and certify tests and reports of results provided to Departmental Representative.
- .5 Departmental Representative to participate.

1.12 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Items listed in this Cx Plan include the following:
- .1 Pre-Start-Up inspections: by Consultant prior to permission to start up and rectification of deficiencies to Consultant's satisfaction.
 - .2 Consultant to use approved check lists.
 - .3 Consultant will monitor all of these pre-start-up inspections.
 - .4 Include completed documentation with Cx report.
 - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Consultant and does not form part of Cx specifications.
 - .6 Consultant will monitor some of these inspections and tests.
 - .7 Include completed documentation in Cx report.
- .2 Pre-Cx activities - ARCHITECTURAL AND STRUCTURAL:
- .1 Vertical transportation:
 - .1 Elevators 1 and 2.

1.13 START-UP

- .1 Start up components, equipment and systems.
- .2 Equipment manufacturer, supplier, installing specialist sub-contractor, as appropriate, to start-up, under Contractor's direction.
- .3 Consultant to monitor all of these start-up activities.
- .1 Rectify start-up deficiencies to satisfaction of Consultant.
- .4 Performance Verification (PV):
- .1 Approved Cx Agent to perform.
 - .1 Repeat when necessary until results are acceptable to Consultant.
 - .2 Use procedures modified generic procedures to suit project requirements.
 - .3 Consultant to witness and certify reported results using approved PI and PV forms.
 - .4 Consultant to approve completed PV reports and provide to Departmental Representative.
 - .5 Consultant reserves right to verify up to 30% of reported results at random.
 - .6 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

1.14 CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Perform Cx by specified Cx agency using procedures developed by Consultant and approved by Departmental Representative.
- .2 Consultant to monitor Cx activities.
- .3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.
- .4 Consultant to witness, certify reported results of, Cx activities and forward to Departmental Representative.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

1.15 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

- .1 Cx to be performed by specified Cx specialist, using procedures developed by Consultant and approved by Departmental Representative.
- .2 Tests to be witnessed by Consultant and documented on approved report forms.
- .3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Consultant and submitted to Departmental Representative for review.
- .4 Departmental Representative reserves right to verify percentage of reported results.
- .5 Integrated systems to include:
 - .1 Fire alarm systems.
 - .2 Emergency power system
- .6 Identification:
 - .1 In later stages of Cx, before hand-over and acceptance Consultant, Contractor, Project Manager, Property Manager and Cx Manager to co-operate to complete inventory data sheets and provide assistance to PWGSC in full implementation of MMS identification system of components, equipment, sub-systems, systems.

1.16 INSTALLATION CHECK LISTS (ICL)

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.17 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Refer to Section 01 91 13.16 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.18 PERFORMANCE VERIFICATION (PV) REPORT

- .1 Refer to Section 01 91 13.16 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.19 DELIVERABLES RELATING TO ADMINISTRATION OF CX

- .1 General:

- .1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

1.20 CX SCHEDULES

- .1 Prepare detailed [critical path] Cx Schedule and submit to Consultant for review and approval same time as project Construction Schedule. Include:
 - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
 - .1 Design criteria, design intents.
 - .2 Pre-TAB review: 28 days after contract award, and before construction starts.
 - .3 Cx procedures: 3 months after award of contract.
 - .4 Cx Report format: 3 months after contract award.
 - .5 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.
 - .6 Notification of intention to start TAB: 21 days before start of TAB.
 - .7 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
 - .8 Notification of intention to start Cx: 14 days before start of Cx.
 - .9 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed [14]days before start of integrated system Cx.
 - .10 Identification of deferred Cx.
 - .11 Implementation of training plans.
 - .12 Cx reports: immediately upon successful completion of Cx.
 - .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to [Property Manager].
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Consultant, Contractor, Contractor's Cx agent, and Departmental Representative will monitor progress of Cx against this schedule.

1.21 CX REPORTS

- .1 Submit reports of tests, witnessed and certified by Departmental Representative to Departmental Representative who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Departmental Representative.

1.22 PRELIMINARY AND FINAL CX

- .1 Not Used.

1.23 ACTIVITIES DURING WARRANTY PERIOD

- .1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
 - .1 Live mode tests of elevators on the fire alarm system.
 - .2 Live mode tests of elevators on emergency power system.

1.24 TESTS TO BE PERFORMED BY DEPARTMENTAL REPRESENTATIVE/USER

- .1 None is anticipated on this project.

1.25 TRAINING PLANS

- .1 Refer to Section 01 79 00.13 - Demonstration and Training for Building Commissioning.

1.26 FINAL SETTINGS

- .1 Upon completion of Cx to satisfaction of Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

1.27 PAYMENTS FOR CX

- .1 Not Used.

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 Includes:
 - .1 Commissioning forms to be completed for equipment, system and integrated system.
- .2 Related Requirements
 - .1 Not Used

1.2 INSTALLATION/START-UP CHECK LISTS

- .1 Include the following data:
 - .1 Product manufacturer's installation instructions and recommended checks.
 - .2 Special procedures as specified in relevant technical sections.
 - .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.
- .3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
- .4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.
- .5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

- .1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative's approval.

1.5 SAMPLES OF COMMISSIONING FORMS

- .1 Departmental Representative will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.
- .2 Revise items on Commissioning forms to suit project requirements.
- .3 Samples of Commissioning forms and a complete index of produced to date will be attached to this section.

1.6 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

- .1 When additional forms are required, but are not available from Departmental Representative develop appropriate verification forms and submit to Departmental Representative for approval prior to use.
 - .1 Additional commissioning forms to be in same format as provided by Departmental Representative.

1.7 COMMISSIONING FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Departmental Representative provides Contractor project-specific Commissioning forms with Specification data included.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide Departmental Representative with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.
 - .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual in accordance with Section [01 92 00 - Facility operation].

1.8 ELEVATOR : TEST DATA FORM - ELEVATOR

.1 PERFORMANCE VERIFICATION (PV).

Elevator no : _____

Date : _____

Adjustment data	Result
Nominal speed	m/s
Rated load	kg
Car movement :	
- Speed (no load – up direction)	m/s
- Speed (no load – down direction)	m/s
- Speed (full load – up direction)	m/s
- Speed (full load – down direction)	m/s
- Landing stop precision (no load)	mm
- Landing stop precision (full load)	mm
- Parameterized acceleration rate. (X)	m/s ²
- Cab travel	mm
- Total travel time	s
- Floor-to-floor travel time up direction	s
- Floor-to-floor travel time down direction	s
Door operation :	(front/ rear)
- Door opening time	s
- Door closing time	s
- Door closing time at reduced speed	s
- Door closing force	kg
- Pause - car calls	s
- Pause - hall calls	s
- Maximum door break time	s
- Pre-opening	mm
Comfort :	
- Door noise level	dBa
- Ambient noise level	dBa
- Noise level, car moving	dBa

Note: For all tables, enter the value and tick (✓) if the result is compliant.

(—) = Item not required or absent..

(X) = Not required in the case of a hydraulic lift.

.2 ÉQUIPEMENT AND AJUSTEMENT DATA

Elevator no : _____

Equipment data		Résultats
Vertical car and counterweight clearances and runbys:		
- Top clearance		mm
- Bottom clearance		mm
- Top runby		mm
- Bottom runby		mm
- Refuge area		mm
Jeu et réserve du contrepoids : (X)		
- Top clearance		mm
- Bottom runby		mm
- Maximum bottom runby (name plate)		mm
Piston bottom runby (hydro only.)		mm
Pit height		mm
Buffers :	Car	Counterweight (X)
- Type		
- Number		
- Tavel	mm	mm
- Capacity	kg	kg
- Maximum speed	m/s	m/s
Door operator (data plate) :		
- Total mass of door equipment		kg
- Closing time at normal speed		s
- Closing time at reduced speed		s
Load weighing device : (X)		
- Device model		
- Signal adjustment « full load »		%
- Signal adjustment « overload »		%
Transformer : (X)		
- Voltage (Primary / secondary)		V
- Power		kVa

Table continued on next page ↓

- ÉQUIPEMENT AND AJUSTEMENT DATA

Elevatort no : _____

Ajustement data			
Lift motor, pump motor:			
Manufacturer		Frame	
Power	kW (hp)	Rated current	A
Voltage	V	Revolution	r/min
Operating current : (X)			Résultats
- Cab no load – up direction			A
- Cab no load – down direction			A
- Cab full load – up direction			A
- Cab full load – down direction			A
Main power : (Line current and voltage)			
- Main disconnect switch:			
- Size			A
- Fuse model			
- Cab waiting			A V
- Cab full load when starting up direction			A V
- Cab full load up direction, normal speed			A V
- Cab no load up direction, normal speed (X) (régénérative system)			A V

.3 EMERGENCY OPERATION AND SIGNALING DEVICES

Ascenseur no : _____

Operation verification		Résultats
Emergency recall operation (Phase I) :		
- Fire recall to the designated level initiated by one of the landing smoke detectors excluding that of the designated level		
- Fire recall to the alternative level initiated by the smoke detector of the designated level		
- Fire recall to the designated level with in car flashing signal initiated by one of the detectors in the control room, the shaft and the alternative level		
- Fire recall to the alternative level with in car flashing signal initiated by one of the detectors in the control room, the shaft and the secondary landing		
- Fire recall initiated by the key switch at the designated landing		
- Fire recall initiated by the key switch at the building fire control station		
- In car signaling device (Visual signal and voice message)		
- Door operation and in car door operation		
- Landing reset operation		
Emergency in-car operation (Phase II) :		
- Visual signal and in car operation		
- Phase 1 fire recall		
Emergency or standby power systems :		
- Positioning signal from the automatic transfer switch		
- Pre-transfer signal from the automatic transfer switch		
- Signaling device and operation at landing station		
- Signaling device and operation at the at the building fire control station		
- Signaling device (warning light and voice message) in car		
- Battery lowering		
Emergency communication (in car) :		
- Manufacturer and model		
- Identification number		
- Incoming call number		
- Emergency call number		
- Identification message recorded		
- Compliance and quality of communication		
- Operation under power loss		

Table continued on next page ↓

- EMERGENCY OPERATION AND SIGNALING DEVICES

Ascenseur N°

Operation verification		Résultats
Emergency communication at the building fire control station :		
- Location		
- Manufacturer and model		
- Incoming call number N° d'appel entrant		
- Indication du statut de l'alimentation		
- Battery status indication		
- Telephone line status indication		
- Origin of calls indication		
- Waiting calls Indication		
- Car call warning		
- Warning in case of system failure		
- Selection of cabins or auxiliary station		
- Operation compliance		
- Compliance of communication with auxiliary stations		
- Compliance of the identification message (if applicable)		
- Door operation and in car maneuver		
- Opération des portes et manœuvre en cabine		
- Operation under power loss		
- Customer confirm that the telephone line is on the emergency power supply		
Telephone line monitoring module (B44-10 and +):		
- Manufacturer / model		
- Signaling and alarm compliance		
- Silent mode operation (reset)		

Following the construction work of the elevators carried out in this building, we certify that the fire alarm and generator tests have been successfully carried out.

Identification and signature of the stakeholders:
Identification et signature des intervenants :

Elevator - Name and title

Company Name

Fire alarm - Name and title

Company Name

Generator set - Name and title

Company Name

.4 ADJUSTMENT AND TEST DATA, CABLE ELEVATOR

Elevator no : _____

Tests	(See Note 1)	Résultats
Parachute test (overspeed at 100%) :		
- Type		
- Tripping speed		m/s
- Stopping distance (sliding)		mm
- Platform level (level variation)		mm/m
Cab shock absorber test (100% at rated speed, otherwise indicate)		
- Release time (fully extended position)		s
Counterweight shock absorber test (0% at nominal speed, otherwise indicate) :		
- Release time (fully extended position)		s
Main brake test (125%):		
- Maintains static charge		
- Down direction, arrival and normal stop at the floor		
- Down direction, nominal speed, emergency stopping distance		mm
- Opening supervision		
Emergency brake test:		
- Model		
- Maintains static charge (125%)		
- Protection against unintended car movements (125%)		mm
- Monitoring in the event of a device failure detection		
- Cabin protection against ascending car overspeed. (0%)		mm
Uncontrolled speed supervision:		
- Via the "Drive" control system		%
- Via the external speed supervision module		%
Slowing down by extreme level normal stop devices (NTS)	Top	
	(125 %) Bottom	
Emergency stop by extreme landing emergency stop devices (ETS / ETSL)	Top	/
	(100%) Bottom	/
Machine traction test (on traction)	(Top / Bottom)	/
Verification of the traction loss detection device: (B44-10 and +)		

Table continued on next page ↓

- ADJUSTMENT AND TEST DATA, CABLE ELEVATOR

Elevator no : _____

Adjustment data	Résultats
Speed governor :	
- Marking plates :	
- Modele	
- Tripping speed	m/s
- Overspeed	m/s
- Holding force	kN
- Calibration :	
- Tripping speed	m/s
- Overspeed switch	m/s
- Jaw pull-trought force	kN
- Minimum force to engage safety's	kN
Équilibrage de la cabine Cab balancing :	
- Method used	
- Counterweight balancing load	%
- Cab mass with equipment	kg
Verification	
- Verification of safety switches, maneuvering and machine room controls	
- Verification of landing door supports and locks	
- Checking of the sheath safety and limit switches	
- Checking the safety switches, maneuvering and controls of the cab roof	
- Verification of safety switches, maneuvering and cabin controls	
- Verification of the auxiliary (emergency) lighting system in the cabin	
- Verification of the functioning of the seismic system	
- Verification of the operation of the emergency brake release module	
- Verification of the lowering battery operation	

Identification and signature of stakeholders:

Elevator - Name and title

Company Name

1.9 ELEVATOR : COMMISSIONING PLAN (95%)

[illegible]

The commissioning plan outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx. The following elements must be included in the commissioning plan: List of Cx Team / Project scheduleImplementation Schedule / Commissioning Schedule / all other elements required in Section 01 91 13.13

Note : Shop drawings, product information forms, manufacturer's sheets, and operation sequence must be included in the Operations and Maintenance Manual that is required prior to the start of training.

Modernization of Elevator Controllers
R.095799

COMMISSIONING PLAN (95%)

1.10 LANGUAGE

- .1 To suit the language profile of the awarded contract.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.
- .2 Related Requirements
 - .1 Not Used
- .3 Acronyms:
 - .1 BMM - Building Management Manual.
 - .2 Cx - Commissioning.
 - .3 HVAC - Heating, Ventilation and Air Conditioning.
 - .4 PI - Product Information.
 - .5 PV - Performance Verification.
 - .6 TAB - Testing, Adjusting and Balancing.
 - .7 WHMIS - Workplace Hazardous Materials Information System.

1.2 GENERAL REQUIREMENTS

- .1 Standard letter size paper 216 mm x 279 mm.
- .2 Methodology used to facilitate updating.
- .3 Drawings, diagrams and schematics to be professionally developed.
- .4 Electronic copy of data to be in a format accepted and approved by Departmental Representative.

1.3 APPROVALS

- .1 Prior to commencement, co-ordinate requirements for preparation, submission and approval with Departmental Representative.

1.4 GENERAL INFORMATION

- .1 Provide Departmental Representative the following for insertion into appropriate Part and Section of BMM:
 - .1 Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.
 - .2 Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.
 - .1 Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.
 - .3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.
 - .4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..
 - .5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.
 - .6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.

- .7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.
- .8 Operating and maintenance manual - Section 3.2 of BMM.
- .9 Final commissioning plan as actually implemented.
- .10 Completed commissioning checklists.
- .11 Commissioning test procedures employed.
- .12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Departmental Representative.
- .13 Commissioning reports.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

- .1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.
- .2 Departmental Representative to review and approve format and organization within 12 weeks of award of contract.
- .3 Include original manufactures brochures and written information on products and equipment installed on this project.
- .4 Record and organize for easy access and retrieval of information contained in BMM.
- .5 Include completed PI report forms, data and information from other sources as required.
- .6 Inventory directory relating to information on installed systems, equipment and components.
- .7 Approved project shop-drawings, product and maintenance data.
- .8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.
- .9 Inventory and location of spare parts, special tools and maintenance materials.
- .10 Warranty information.
- .11 Inspection certificates with expiration dates, which require on-going re-certification inspections.
- .12 Maintenance program supporting information including:
 - .1 Recommended maintenance procedures and schedule.
 - .2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

1.6 LIFE SAFETY COMPLIANCE (LSC) MANUAL

- .1 Samples of LSC Manual will be available from Departmental Representative.
- .2 Content of Manual:
 - .1 All possible Emergency situations modes including: presence of fire and smoke, power failure, lose of water or pressure, chemical spills and refrigerant release.
 - .2 Failure of elevators and escalators.
 - .3 HVAC emergencies and fuel supply failures.
 - .4 Intrusion and security breach.
 - .5 Emergency provisions for natural disasters, bomb threats and other disruptive situations.
 - .6 Dedicated emergency generators for high security projects, medical facilities and computer systems.
 - .7 Emergency control procedures for fire, power and major equipment failure.

- .8 Emergency contacts and numbers.
- .9 Manual to be readily available and comprehensible to non- technical readers.

1.7 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

- .1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:
 - .1 General:
 - .1 Finalized commissioning plan.
 - .2 WHMIS information manual.
 - .3 Approved "as-built" drawings and specifications.
 - .4 Procedures used during commissioning.
 - .5 Cross-Reference to specification sections.
 - .2 Architectural and structural:
 - .1 Inspection certificates, construction permits.
 - .2 Roof anchor log books.
 - .3 PV reports.
 - .3 Fire prevention, suppression and protection:
 - .1 Test reports.
 - .2 Smoke test reports.
 - .3 PV reports.
 - .4 Mechanical:
 - .1 Installation permits, inspection certificates.
 - .2 Piping pressure test certificates.
 - .3 Ducting leakage test reports.
 - .4 TAB and PV reports.
 - .5 Charts of valves and steam traps.
 - .6 Copies of posted instructions.
 - .5 Electrical:
 - .1 Installation permits, inspection certificates.
 - .2 TAB and PV reports.
 - .3 Electrical work log book.
 - .4 Charts and schedules.
 - .5 Locations of cables and components.
 - .6 Copies of posted instructions.
- .2 Assist Departmental Representative with preparation of BMM.

1.8 LANGUAGE

- .1 English and French Language to be in separate binders.

1.9 IDENTIFICATION OF FACILITY

- .1 When submitting information to Departmental Representative for incorporation into BMM, use following system for identification of documentation:
- .2 Vertical transport system

- .1 Section 0 - General
 - .1 List of suppliers
 - .2 Description of inspections and maintenance
 - .3 Statement of Work Compliance Document (RBQ) and Test Forms
 - .4 Letters of Guarantee
 - .5 Key Training
- .2 Section 1 - Controllers
 - .1 Product Description
 - .2 User's Manual
 - .3 Electrical plans
 - .4 Adjustment - drive / control parameters
 - .5 Other
- .3 Section 2 - Traction Machine
 - .1 Traction machine equipment
 - .2 Measurement of cables
 - .3 Other
- .4 Section 3 - Hydraulic Machine
 - .1 Hydraulic equipment
 - .2 Other
- .5 Section 4 - Door Equipment
 - .1 Door Operator
 - .2 Equipment for landing and car doors
 - .3 Door Reopening Device
 - .4 Other
- .6 Section 5 - Hoistway Equipment
 - .1 Position reader
 - .2 Inspection Device
 - .3 Hoistway Switches
 - .4 Other
- .7 Section 6 - Accessories
 - .1 Car and floors fixtures
 - .2 Voice Announcer
 - .3 Car Communication System
 - .4 Load Measurement Device - Description / Adjustment
 - .5 Parts Catalog
 - .6 Complete list of spare parts.
 - .7 Other
- .8 Section 7 - Plans " As Built "
- .9 Section 8 - Miscellaneous

1.10 USE OF CURRENT TECHNOLOGY

- .1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.
- .2 Obtain Departmental Representative's approval before starting 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 Contents of Division 14
 - .1 Section 14 00 00 – Additional General Conditions
 - .2 Section 14 20 06.1 – Elevator 1
 - .3 Section 14 20 06.2 – Elevator 2
 - .4 Section 14 90 00 – Elevator & freight elevator maintenance
- .2 Related sections
 - .1 Section 01 11 01 – Summary of work
 - .2 Section 01 14 00 - Work restrictions.
 - .3 Section 01 32 16.19 - Construction Progress Schedules - Bar (GANTT) Charts.
 - .4 Section 01 33 00 - Submittal Procedures.
 - .5 Section 01 35 29.06 - Health and Safety Requirements.
 - .6 Section 01 35 43 – Environmental Protection.
 - .7 Section 01 41 00 – Regulatory requirements
 - .8 Section 01 51 00 – Temporary utilities.
 - .9 Section 01 52 00 – Construction facilities.
 - .10 Section 01 56 00 – Temporary barriers and enclosures.
 - .11 Section 01 61 00 - Common Product Requirements.
 - .12 Section 01 73 00 – Execution.
 - .13 Section 01 74 00 – Cleaning.
 - .14 Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
 - .15 Section 01 77 00 - Closeout procedures.
 - .16 Section 01 78 00 - Closeout Submittals.
 - .17 Section 01 79 00 – Demonstration and training
 - .18 Section 01 79 00.13 – Demonstration and training for building commissioning
 - .19 Section 01 91 13 - General Commissioning requirements.
 - .20 Section 01 91 13.13 – Commissioning Plan
 - .21 Section 01 91 13.16 – Commissioning Forms.
 - .22 Section 01 92 00 – Facility operation

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/NEMA MG 1-2003, Motors and Generators.
- .2 Canadian Standards Association (CSA International).
 - .1 ASTM A17.1-2010/CSA B44-2010, Safety Code for Elevators and Escalators.
 - .2 CAN/CSA-B651-18, Barrier-Free Design.
 - .3 CAN/CSA-B355-09
 - .4 CAN/CSA C22.10, Quebec Electrical Code
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

- .1 Material Safety Data Sheets (MSDS).
- .4 National Building Code (NBC).
 - .1 National Building Code of Canada 2015.

1.3 PERFORMANCE REQUIREMENTS

- .1 The Contractor shall consider that the specifications are performance specifications. It includes among others the performance to be achieved, constraints and criteria to be followed, to observe the spatial requirements and quality standards that must be met.
- .2 The Contractor shall take into account in its tender that the plans and specifications represent performance to be achieved, and if some visible or hidden works not shown on the plans and / or described in the specifications are necessary for the successful completion of the work, he will be required to execute them without additional cost to the Departmental Representative.
- .3 In all cases where the singular is used in the specifications, it is understood that the same applies to the plural reference when necessary to adequately complete the installation
- .4 In all cases where the term <supply> is used, it is understood that this also means the complete installation by the Contractor.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit manufacturer's printed product literature, specifications and data sheet.
 - .1 Submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate project layout, including details and the following information:
 - .1 Size and location of machine and controller.
 - .2 Not used
 - .3 Not used
 - .4 Not used
 - .5 Not used
 - .6 Not used
 - .7 Not used
 - .8 Not used
 - .9 Not used
 - .10 Not used
 - .11 Not used
 - .12 Shop drawings submitted stamp by qualified professional engineer registered in Province of Quebec.
 - .13 Include on general arrangement drawings:
 - .1 Complete project references;
 - .2 All Code requirements;

- .3 Agreement and dimensions of equipments in machine room;
- .4 Not used
- .5 Not used
- .6 Not used
- .7 Signalling equipment, including cab and floor call buttons, position indicator, direction indicators and any other apparent devices;
- .8 Not used
- .9 Not used
- .14 Provide wiring diagrams.
- .2 The Contractor shall submit (4) copies of shop drawings (4 paper formats, as well as Autocad drawings file), for examination by Departmental Representative, within a reasonable time and in a logical sequence so as not to delay the works.
- .3 The Contractor shall make the changes to shop drawings required by the Departmental Representative and must resubmit unless noted otherwise. Otherwise, the Contractor shall ensure that its changes are clearly identified on the new documents submitted
- .4 Any changes to a drawing should be clearly identified with a cloud and a revision number.
- .4 Samples:
 - .1 Submit two samples, complete with colour schemes, 150 x 150 mm in size, illustrating: floor material, car interior, car ceiling, car door, hoistway entrance door and frame finishes.
- .5 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .6 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .7 Instructions: submit manufacturers installation instructions.
- .8 Manufacturers Field Services: submit copies of manufacturers field reports.
- .9 Closeout Submittals:
 - .1 Submit the following in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Project Record Documents:
 - .1 Record actual locations of equipment, names of equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects.
 - .3 Operation and Maintenance Data:
 - .1 Include description of elevator system's method of operation and control including group supervisory control system, motor control system, door operation, signals, firefighter's service, emergency power operation, and special or non-standard features provided.
 - .2 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
 - .3 Legible schematic wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed

corresponding to identity or markings on both machine room and hoistway apparatus.

- .4 Instruct Departmental Representative in maintenance of special finishes.

1.5 QUALITY ASSURANCE

.1 Qualifications:

- .1 Installer Qualifications: company or person experienced in performing work of this section specializing in installation of work similar to that required for this project.

.2 Health and Safety

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle components in accordance with Section 01 61 00 - Common Product Requirements and in accordance with manufacturer's written instructions.

.2 Packing, Shipping, Handling and Unloading:

- .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Storage and Protection:

- .1 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

.4 Waste Management and Disposal:

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
- .4 Separate for reuse and recycling and place in designated containers Metal and Plastic waste in accordance with Waste Management Plan (WMP).
- .5 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

- .5 Refer to the plans for storage areas, outside of the elevator machine room affected by the work.

1.7 WARRANTY

- .1 For the Work of Section 14 00 00 and related, the warranty period of 12 months will begin at the partial substantial work completion of each modernized elevator group.

1.8 EXTENDED WARRANTY

- .1 For the Work of Section 14 00 00 and related, the warranty period of 12 months of the first modernized elevator groups is extended until the end of the 12 months warranty period of the last modernized elevator group to achieve a common end date of the warranty.

- .2 For the Work of Section 14 00 00 and related, the warranty period of 12 months is extended to 36 months and must cover the elements which have the following defects:
 - .1 Blistering, spalling or peeling of paint due to improper surface preparation or material application.
 - .2 Opening of joints due to improper design or use of ineffective fastening devices.
 - .3 Separation, cracking or splitting of plastic laminate due to improper application to core material, or to method of fabrication which gives rise to areas of high stress concentration or which restricts normal expansion or contraction of plastic laminate.

1.9 MAINTENANCE SERVICE

- .1 Provide full maintenance service of all elevators (1-2-3-4-5-2s) as per requirements of Section 14 90 00.
- .2 Full maintenance service includes the following periods:
 - .1 Interim period, before and during the equipment modernization. The interim period will begin one week before the start of the modernization work on the first elevator group (group 1).
 - .2 The warranty period and extended warranty periods. The extended warranty periods will end 12 months following the modernization of the last modernized elevator group.
 - .3 The period of 60 months (5 years) following the extended warranty periods. This extended maintenance period may be subject to renewal for an other 5 years periode.

1.10 EXECUTION TIMELINE

- .1 Plan and include all costs and work in accordance with the sequences and timeframes as specified in section 01 14 00 - Work restrictions
- .2 During the entire project, always have on site the main material for the following modernization group ie for the next three elevators.

1.11 SPECIFICATIONS OWNERSHIP

- .1 All copies of plans and specifications provided by Departmental Representative are his property. They should not be used for another job and can not be copied or revised in any manner whatsoever without written authorization.

1.12 DIMENSIONS

- .1 Supply and install all the equipments to suit the dimensions specified in the specifications and the various plans.
- .2 The *Contractor* has the responsibility to check the on site dimensions as well as the site conditions.

1.13 DOCUMENT REVIEW

- .1 The Contractor shall review the project tender documents to fully assess the scope of work to be performed and the quality of materials required.

- .2 An on site visit by the contractor is required to assess the existing conditions and work requirements and to obtain all information or clarification for the proper execution of the work.
- .3 If the Contractor detects any errors or omissions in the specifications, the latter shall inform the Departmental Representative. Any additional costs due to a lack that will not be identified will be defrayed by the Contractor.

1.14 ELEMENTS

- .1 Unless amendment is approved, the main elements of vertical transport equipment used in this project must be new current production genuine parts.
- .2 Control devices must come from a single manufacturer.
- .3 All control devices installed in this contract shall be of the same generation or 100% compatible with each other.
- .4 The proposed systems shall have been installed in at least three buildings of similar size and be in operation for at least two years.
- .5 The Contractor shall confirm the items when submitting shop drawings.

1.15 ACCEPTABLE MATERIALS OR PRODUCTS

- .1 Acceptable materials or products: When materials or products are prescribed by their trademark, see the Instructions to Tenderers to know how to proceed for approval of materials or replacement products. Replacement product must be approved by addendum in accordance with the Instructions to Tenderers.

1.16 ACCESS TO INFORMATION STATEMENT

- .1 Before the final acceptance, submit in accordance with Section 01 78 00 Closeout Submittals to the Departmental Representative all the information relating to programming and controller components of the project.
- .2 Provide fully non-proprietary versions of all control equipment including:
 - .1 The Contractor shall submit, 10 after the award of the contract, a letter attesting that the proposed material is fully non-proprietary.
 - .2 All required diagnostics are "on board".
 - .3 All programming and diagrams required for long-term maintenance are provided with the controller.
 - .4 The controller will not shut down or alter its functionality in any way after a pre-determined increment of time or use.
 - .5 Any elevator contractor should be allowed to purchase parts, supplies, diagrams, support, or training directly from the factory at the same cost level as the original installer. A published price list shall be supplied with the controller.
 - .6 Parts including circuit boards should be available for direct purchase from the factory in numbers and not on an one-for-one "exchange only" basis.
 - .7 Provide a written warranty from the manufacturer of the control equipment stating that software and firmware updates will be provided free of charge to the Owner for the entire useful life of the equipment.

- .3 Provide 3 copies of the final version of the controllers program on CD-ROM as well as the access codes associated to it. Also provide all the tools (programming console, access codes, cable, and operation manual etc.) to access the controller's programming internal coded modules. The elevator installer or supplier shall in no case insert locks or password restricting access to the programming or operation of equipment. If the contract is terminated, provide the Owner with a hard copy of the access codes and access tools of devices or components requiring such codes or tools for their commissioning, programming or other purposes.
- .4 The Contractor agrees to the following: In the event of termination of maintenance service with the installer of the equipment, the Contractor and the supplier shall undertake to provide expertise on demand for equipment repair and adjustment and replacement parts within 48 hours, for a period of 15 years following the installation of equipment, with pay for labor and parts to the market price. This applies to parts having a right of property <patent> and / or not available elsewhere than at the original manufacturer <installer> equipment.
- .5 The Contractor agrees to the following: In the event of termination of business or bankruptcy of the installer of the equipment or its supplier, the latter shall provide, with compensation, all information relating to programming and components of control devices of the project.

1.17 WORK NOTIFICATION

- .1 The Contractor shall after the end of Work, report them to the RBQ (Régie du Bâtiment du Québec) within the time they prescribed. A copy must also be sent to Departmental Representative.

1.18 SUPPLIERS LIST

- .1 The Contractor shall submit with the Bid all the names of suppliers and products and proposed models for the main components, including motors, control equipment, door systems and signalling devices.

1.19 TRADEMARKS

- .1 Trademarks are not allowed on equipment apparent to the public.
- .2 Identify clearly within the controller cabinet in the control room, the name of the elevator company that has completed the installation of the equipment.

1.20 PLANS AND SPECIFICATIONS ON SITE

- .1 Throughout the construction period, keep on site, for reference by mechanics, an updated and approved by Departmental Representative copy of the plans and specifications.

1.21 COORDINATION

- .1 Coordinate the work with the Departmental Representative and other trades in accordance with the project schedule.
- .2 Store new materials in areas designated by Departmental Representative.
- .3 Provide all the workspaces protection to ensure the safety of workers, technicians, occupants and the public.

- .4 Coordinate work with other trades to minimize the impact of these activities on the property. The work must minimize disruption of building activities. In some cases, the Departmental Representative may request that certain tasks be done at a specific time and at no additional cost.

1.22 PREVENTIVE MEASURES

- .1 The Contractor shall perform and comply with the procedures described below, for all the work of this project.
 - .1 The Contractor shall perform the work using methods that minimize dust generation during construction / renovation;
 - .2 Contractor, in addition to solid wall, shall seal unused doors with adhesive tape to partition the work area;
 - .3 The Contractor shall seal the exhaust vents and air supply in the areas of construction / renovation. A strict protocol must be adopted on this subject considering the activities of the Owner involving the presence of several laboratories called clean rooms;
 - .4 When construction workers must use public areas of the building, they shall clean themselves on the work site, and be sure to remove most of the dirt and dust on their clothes and shoes.
 - .5 When the contractor circulate in the building, he is responsible for cleaning his dirt.

1.23 SAFETY MESURES

- .1 This article states the minimum standard and does not limit in any ways the responsibilities and obligations of the Contractor. In case of conflict between the security measures set out below and the established practices of the Departmental Representative, the established practices of the Departmental Representative have precedence. The Departmental Representative may at its sole discretion, impose additional standards of safety.
 - .1 The Contractor shall not use the materials, tools and equipment belonging to the Departmental Representative without the consent of the latter.
 - .2 Departmental Representative may, at its discretion and according to his instructions, suspend or terminate the work of the Contractor for reasons of security without liability to Departmental Representative or any compensation for the Contractor. The instructions and stop work shall be recorded by the Contractor and the Departmental Representative, they will agree on the date and method of resumption.
 - .3 The Contractor shall provide and install quality warning signs and temporary solid walls partition at the two (2) lower levels and the upper level delimiting the workspace when the work is done in public areas or hamper public traffic. Temporary partitions must have solid walls and be high enough to cover the space between the floor and ceiling. Access door must be closed with a padlock.
 - .4 The Contractor shall provide and install quality warning signs and temporary partitions (barricades) with a minimum height of 42 inches for the protection of public areas for work done at any other floor.
 - .5 The Contractor shall submit, for approval by the Departmental Representative, the workspaces perimeter for each elevator. It is understood that these workspaces must be relatively small in public areas or when hindering public traffic areas.
 - .6 The Contractor shall provide and install adequate protections to prevent fall of equipment, tools and other over the entire length of the elevator hoistway.

- .7 The Contractor has the responsibility to inform the Departmental Representative of any hazardous or unsafe conditions, and in the shortest possible time.

1.24 SECURITY MESURES - HOT WORK

- .1 The Contractor must follow the procedures outlined in the building orientation guide.

1.25 SECURITY MESURES – CONFINED SPACE

- .1 The Contractor must evaluate each of the existing confined spaces on its work site depending on the nature of its interventions and as a function of his work (welding, gas, paint, etc.). The evaluation forms used must contain at least the information required in the form FEL 104. The contractor shall transmit the risk assessment forms to Departmental Representative at least 5 days before the date set for entry into these confined spaces. He should include all costs for the measures to be taken, monitored and strictly enforced in order to meet safety requirements for confined spaces.

1.26 SITE CLEANLINESS AND SAFETY

- .1 Throughout the duration of the work, protect and keep clean the machine room and equipment therein, the elevator cab and the public areas.
- .2 Prior to Commissioning and in order to obtain acceptance with and / or without reserve, public areas, the elevator hoistway and machine room shall be cleaned and closed at the satisfaction of the Departmental Ministerial.

1.27 OPENING AND ACCESS TO WORK

- .1 The Contractor is responsible for the following:
- .1 All openings or leveling compounds necessary for the performance of this contract is to be performed by the Contractor.
 - .2 Any opening in wall or ceiling, necessary for the execution of the work is to be performed by the Contractor.
 - .3 The Contractor shall obstruct and return to the original state components wholly or partly demolished.

1.28 CONTRACTOR FAILURE

- .1 In the event of the Contractor inability to do correctly the work described in the specifications, or correct operating problems, the Departmental Representative reserves the right to perform the work by others at the expense of the Contractor.
- .2 Should any problem causing a serious delay on the original schedule, the Departmental Representative will give a written 10 days notice to the Contractor to avail the clause above.

1.29 MANUALS

- .1 Prior to the commissioning of first modernized elevators group, submit in accordance with Section 01 78 00 - Closeout Submittals the operation and maintenance manuals.
- .2 Provide a minimum of three (3) copies of the manuals bound in binders with dividers and tables of contents as well as a Portable Document Format (PDF) version on CD-ROM and USB key.

- .3 Include in these manuals, a technical description of all system components and approved shop drawings.
- .4 Include a complete list of spare parts to drawing and identification number.
- .5 Provide the parts list including their average useful life and addresses of suppliers.
- .6 Include a detailed description of special systems such as fire recall and emergency power.
- .7 Not Used
- .8 Include in the maintenance manual a schedule of routine work required as part of preventive maintenance.

1.30 ELECTRIC DIAGRAMS

- .1 Prior to commissioning, submit in accordance with Section 01 78 00 - Closeout Submittals copies of the as-built wiring and schematic diagrams.
- .2 Provide a minimum of three (3) printed copies of the diagrams as well as Portable Document Format (PDF) and CAO (in AutoCAD format) version on CD-ROM.
- .3 Display plasticized copies of the electrical diagrams, approved by an engineer, in the machine room.

1.31 TECHNICAL FORMATION

- .1 Prior to commissioning, organize with the Departmental Representative training sessions covering the equipment operation.
- .2 These training sessions should cover the operation of the above systems:
 - .1 Not Used
 - .2 Not Used
 - .3 Not Used
 - .4 Emergency Recall
 - .5 Emergency power
 - .6 Various switches and other.

1.32 TEST DATA FORMS

- .1 Prior to commissioning, submit in accordance with Section 01 91 13.16– Commissioning Forms, the test data forms.
- .2 Perform all tests required by Section 8 of the ASTM A17.1-2010/CSA B44-2010 Code and or any other test requested by the competent authorities.
- .3 Provide the Departmental Representative the test certificates issued by the competent authorities.

1.33 ASSISTANCE FOR INSPECTIONS

- .1 During the supervision and coordination of the work by the Departmental Representative throughout the project, provide good collaboration to ensure satisfactory execution.

- .2 An inspection of the elevator will be made by the Departmental Representative to verify compliance with the specifications requirements.
- .3 Provide a team of trained mechanics to help the Departmental Representative in the course of these inspections.
- .4 Arrange to perform the required emergency manoeuvre and emergency power operation tests in the course of these inspections in collaboration with the project electrician.
- .5 Provide the Departmental Representative a complete set of keys for the tests to be done during his inspection.
- .6 In the event that the said works are not corrected by the date agreed in writing by the Contractor, all costs related to a second inspection will be at the Contractor expense.

1.34 ACCEPTANCE PROCESS

- .1 Prior to Commissioning and in order to obtain acceptance with and / or without reserve, public areas, the elevator hoistway and machine room shall be cleaned and closed at the satisfaction of the Departmental Ministerial.
- .2 Inform in writing the Departmental Representative, one (1) week in advance, of the proposed date for the elevator inspection.
- .3 Prior to the inspection of the Departmental Representative, provide the test data forms.
- .4 Plan a second execution of the tests along with the Departmental Representative during the inspection of the elevator.
- .5 The Contractor shall perform, at its expense, all testing and provide the necessary support team for assistance during inspections of the Departmental Representative.
- .6 An inspection of the elevator will be made by the Departmental Representative to verify compliance with the specifications requirements.
- .7 Following the issuance of the list of deficiencies, the Contractor will have a maximum of 30 days to correct the deficiencies.
- .8 The final acceptance will be done after the correction of all deficiencies issued by the Departmental Representative and before the warranty period of the equipment.

1.35 BREAK-IN PERIOD

- .1 Plan a 5 days break-in period before the shutdown for modernization of another elevator. This period will be used to identify anomalies and fix problems that may arise. All elevators in the group shall be operational during the break-in period.

1.36 BARRIER-FREE

- .1 Provide all requirements for Barrier-Free operation listed in Appendix E of the CAN/CSA-B44-07 Code and CAN/CSA B651-12 standard.

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 Related sections
 - .1 Section 14 00 00 – Additional General Conditions

1.2 SYSTEM DESCRIPTION

- .1 Modernize the existing elevator as described in the following tables and the requirements of this section:
 - .1 (1) existing traction elevator (No. 1) with geared traction machine located on the side at the bottom of the hoistway.
- .2 The following requirements must be met for all elevators described in this section:
 - .1 Barrier-Free in accordance with CAN/CSA B651-18, Barrier-Free Design.
 - .2 Bilingual Markings:
 - .1 Provide identification and instructions on operating panels and on signal equipment in English and French except where design is such that inference is obvious and readily understood.
 - .3 Retain existing car speed and capacity.
 - .4 Provide equipment to suit the existing hoistway and machine room dimensions.
 - .5 Check all dimensions on the site.
 - .6 Design and modernize the elevator in accordance with ASTM A17.1-2010/CSA B44-2010, local codes and regulations.

.3 Existing system – Elevators #1

System BEFORE modernization:

Unit number :	1
Designation :	Passengers
Installation date :	1970
Floor served :	3 stops, 2 front exit (SS-1) and 1 at rear (2) : SS, 1, 2
Nominal speed :	↑↓ 0,38 m/s
Capacity :	1 814 kg
Machine manufacturer :	Otis
Machine type :	Basement traction machine / 2:1
Motor manufacturer :	Otis
Motor type :	AC, 10,5HP, 15,5A, 600 V
Controller manufacturer :	Otis
Controller type :	Relay
Dispatch type :	Simplex
Ropes :	4 of 12,7 mm
Door type :	Side opening / (2) speed
Door size :	1 219 mm X 2 134 mm
Door fire rating:	None
Cab size :	1 575 X 1 969 X 2 463 mm

Car equipment description

Fixture

Position indicator	Analog
Car lantern	Not Provided
Arrival gong	
Floor gong	
Voice synthesizer	Not Provided
Button - height	Not Conform
Button - model	Otis
Braille	Not Provided
Independent service	Not Provided
Emergency In-car Operation	Not Provided
Communication system	Provided (hand set)

Equipment

Emergency light	Provided
Door protection	Infrared
Handrail	2 sides
Handrail - height	Not Conform
Door operator	Otis
Interlock	Otis
Car guides	Swivel
Inspection unit	Not Conform
Refuge area	Provided

Hall equipment description

Fixture

Position indicator	Analog
Hall lantern	Not Provided
Gong	Not Provided
Button - height	Not Conform
Button - model	Otis
Braille	Not Provided
Emergency Recall	Not Provided
Operation	
Emergency power	Not Provided

Equipment

Interlock	Otis
Door track	Otis
Door closer	Weight
Door fire pin	
	Bottom
	Top
Mechanical access	Provided
Electrical access	Provided (SS, 1)
	Not Conform

1.3 PERFORMANCE REQUIREMENTS

- .1 Codes and Regulations
 - .1 Design, supply and install all equipment in accordance with the latest editions of the ASTM A17.1-2010/CSA B44-2010 Code (update included), CAN/CSA-B651-18 Code and any other federal, provincial and municipal regulations applicable for this type of installation, including the National building Code of Canada and the Quebec Electrical Code.
- .2 Driving Force
 - .1 Equipment driving force must comply with existing systems. In the case of non-compliance of the driving forces, the Contractor shall assume all costs associated with this change (electrical, air conditioning, etc.).
- .3 Controller
 - .1 Provide Simplex Collective Selective microprocessor controls.
 - .2 Elevator controller systems must not be equipped with a programmable logic controller and must be generic types.
- .4 Hall Calls
 - .1 Elevators to answer hall calls during working days; within following times:
 - .1 38% of calls within 10 seconds maximum.
 - .2 63% of calls within 20 seconds maximum.
 - .3 80% of calls within 30 seconds maximum.
 - .4 88% of calls within 40 seconds maximum.
 - .5 93% of calls within 50 seconds maximum.
 - .6 95% of calls within 60 seconds maximum.
- .5 Call Sequence
 - .1 Provide a control system managing car and hall calls in ways to minimize overall average waiting time.
 - .2 Upon arrival at the destination floor, the call must be cancelled.
 - .3 Do not permit registration of car calls behind the running position of an elevator.
 - .4 Cancel all car calls in the situation of excessive car calls according to cab occupation.
- .6 Direction Sequence
 - .1 The elevator starts when one or more car or hall push buttons are activated, other than the one where the elevator stands. The cab stops at the first call from a cab or hall depending on the travelling direction.
 - .2 The elevator should answer all car and hall calls; it should stop at every called floor, in numerical order, depending on the travelling direction. The call should have been made some time before the elevator gets to this floor.
 - .3 If no order from the cab has been made, the cab travelling in the up direction to answer calls for down direction should stop at the top floor where a call has been registered, reverse elevator direction, and answer all floors requested, in decreasing numerical order. The opposite should occur when the elevator is travelling down to answer up calls.
 - .4 The elevator answering a car call will be designated to answer the hall call at this level in the opposite direction given this elevator has not been assigned more call in its direction of travel.

- .7 Parking
 - .1 Not Used
- .8 Fault recovery
 - .1 Recall an elevator to the nearest floor and open door when an operation fault is detected within the system.
- .9 Pre-opening
 - .1 Provide advance opening operation of the car doors.
 - .2 Ensure that the door will initiate the opening cycle at a maximum of 75 mm from the landing floor.
- .10 Speed Control System
 - .1 Ensure that the average acceleration is not less than 0.60 metres per square seconds and not exceeding 1.1 metres per square second.
 - .2 Ensure that the rate of change in acceleration does not exceed 1.8 metres per cubic second.
 - .3 Ensure that the car stop and start smoothly.
- .11 Door Operation
 - .1 Provide smooth door open and close cycle.
 - .2 The doors shall open automatically when the car arrives at a landing floor.
 - .3 The doors shall reopen when the door protective devices are activated.
 - .4 Arrange that when the door protective devices are activated for more than 20 seconds continuously, a nudging buzzer signal is activated
 - .5 Arrange that and the door closes at reduced torque and speed when the door protective devices are activated for more than 20 seconds.
 - .6 The door speed must be reduced in half when the doors are closing and the reopening device has been rendered inoperative by the fire recall.
- .12 Performance levels
 - .1 Design and adjust the equipment to meet the following performance levels:
 - .1 Operating time shall be as follows. Measure from the time doors closing cycle begins until doors are three quarters opened on the next floor, assuming a maximum floor height of 4000 mm.
 - .1 Up: 14.5 seconds
 - .2 Down: 14.5 seconds
 - .2 Door open and close time equal to values shown below.
 - .1 Open: 3.0 seconds
 - .2 Close: 4.0 seconds
 - .3 Doors dwell time in response to a car or hall calls equal to values shown below.
 - .1 Car call : 2.0 seconds
 - .2 Hall call : 3.0 seconds
 - .4 Speed variation shall not exceed 5% of nominal value.
 - .5 Door noise levels shall not exceed +6 dBA higher than ambient noise.
 - .6 Car running noise levels shall not exceed +6 dBA higher than ambient noise.

- .7 Machine room noise levels shall not exceed 75 dBa, as measured when one elevator is running.
- .13 Levelling
 - .1 Ensure automatic levelling of the car at reduced speed in both up and down directions.
 - .2 The automatic levelling will be made with the accuracy of 6 mm unrelated to the car load.
 - .3 The levelling of the car sill compared to hall sill should not exceed +/- 6 mm in either direction as long as the car is in the levelling zone.
- .14 Independent service
 - .1 Provide in-car independent service operation.
 - .2 Cancel door protective device operation.
 - .3 Cancel hall button operation.
 - .4 Cancel hall lanterns operation.
 - .5 When the car is parked doors must remain open.
 - .6 Elevator will be controlled only from inside the car.
 - .7 Elevator may respond to the car calls only once the full closing of the door, by maintaining a constant pressure button "CLOSE" or the button corresponding to the desired level.
 - .8 Arrange that the doors will reopen if the door "CLOSE" button is released prior to elevator motion.
- .15 Emergency Operation
 - .1 Provide Emergency Recall Operation - Phase I in accordance with ASTM A17.1-2010/CSA B44-2010 Code.
 - .2 Provide Emergency In-car Operation - Phase II in accordance with ASTM A17.1-2010/CSA B44-2010 Code.
- .16 Emergency Power Operation
 - .1 Emergency power will be available for the elevator.
 - .2 Provide Emergency Power Operation in accordance with ASTM A17.1-2010/CSA B44-2010 Code and as describe below.
 - .1 Two signals indicating the normal and emergency power connecting dry contact relay will link the transfer switch and the controller. A pre-transfer signal will be given by these signals.
 - .2 A normally close circuit will be open when normal alimentation is lost. When it's open, recall the elevators sequentially (1 elevator per group) to the recall level and open the door.
 - .3 Not used
 - .4 Once the sequence recall is complete, elevators must run automatically on emergency power as follows:
 - .1 Elevator No. 1: elevator will remain available on emergency power for public use.
 - .5 Not used
 - .6 Not used
- .17 Car intercommunication system
 - .1 Provide connection to the existing bilateral intercommunication system.

- .2 If the intercommunication system is normally connected to the building power supply, it shall automatically transfer to a source of standby or emergency power after the normal power supply fails. The power source shall be capable of providing for illumination of the visual indication within the car, and the intercommunication system for at least 4 h
- .18 Access control
 - .1 Design the controller to connect with a card reader access control system in the car as defined in the following section.

Part 2 Products

2.1 MACHINE – GEAR TRACTION SYSTEM

- .1 Remove the existing machine and sheaves.
- .2 Supply and install a geared traction machine located on the side at the bottom of the hoistway.
 - .1 Provide traction sheave of 635 mm minimum
 - .2 Provide hoist cables with a minimum diameter of 12,7 mm
 - .3 Provide a 2:1 arrangement .
- .3 Choose a machine suitable for the dimensions of the machine room as well as the existing accesses. No new opening will be made by the *Departmental Representative* as part of the work to provide access to the machine room.
- .4 Retain the existing foundation beams
- .5 Supply and install a new steel base for the machine duly anchored to the existing structure of the building.
- .6 Provide all the necessary anchors for the installation of the base on the floor of the machine room.
- .7 Supply and install any new support beams required in the machine room and / or at the top of the shaft for the machine and the deflection pulleys of the car and the counterweight.
- .8 Supply and install new deflection sheaves (including support and bearing) in the machine room and / or in the hoistway for guiding the hoist cables of the car and the counterweight.
- .9 Provide a machine with a mechanical efficiency greater than 80%.
- .10 Limit horizontal gap and gear gap to a maximum of 0.125 mm at balanced load
- .11 Provide traction sheave with depth grooves equal to 3/4 of the rope diameter.
- .12 Provide pulleys equipped with cable retainers and greasable bearings.
- .13 Seat the machine on high performance anti-vibration pads.
- .14 Paint all the non-machined metal surfaces.
- .15 Identify the machine with a number.

2.2 MACHINE - MOTOR

- .1 Provide a motor force complying with the values given in tables of section 1.2 of these specifications and meet the existing electrical inputs.
- .2 Provide a new alternative current motor with a permanent magnet in series with the electronic control transformer.
- .3 Provide a low slip motor type with a maximum temperature of 50°C and minimum class B insulation.
- .4 Provide circuits to limit the current fed in the motor and motor overheat.
- .5 Ensure that the machine and motor are properly balanced and aligned so that vibrations at the end of the motor are not exceeding 0,025 mm at the end of the motor. This work must be carried out by a company specializing in the field following the insertion of the machine into the machine room.

2.3 MACHINE – BRAKE SYSTEM

- .1 Provide a disc brake type device.
- .2 Provide an electromechanical brake system to allow the car to stop normally, at full capacity, when power is interrupted
- .3 Ensure that the brake system will hold 125% of the rated capacity.
- .4 Secure with pins the position of the final adjustment of the brake spring
- .5 Supply and install a monitoring brake switch preventing movement of the car in the following situations:
 - .1 Brake does not open.
 - .2 Brake does not close.
 - .3 Excessive wear of brake pads that may affect the brake operation.
 - .4 Excessive gap that can affect the brake operation.

2.4 MACHINE – SPEED CONTROL SYSTEM

- .1 Supply and install an electronic feedback speed control system, including the following items:
 - .1 A tachometer linked to the machine shaft to provide reading of elevator speed;
 - .2 This encoder shall have an optimal reading range exceeding 20% of the minimum elevator speed;
 - .3 A microprocessor-based speed regulator system reading speed input and generating corrective output signals;
 - .4 Safety circuits to stop the elevator when the acceleration exceeds by 20% the required acceleration and when the speed exceeds by 5% the required speed.

2.5 AUXILIARY EMERGENCY BRAKE (ROPE BRAKE)

- .1 Provide auxiliary brakes as per code and the following:
 - .1 Brakes shall apply when up speed exceeds 110% of nominal speed. The brake must be manually reactivated before the car is allowed to move.

- .2 Brakes shall apply when cab leave floor with doors open.
- .2 The auxiliary emergency brake system must be independent of normal braking devices, except for the dual brakes that can bear the rated load.
- .3 Provide a hydraulic device mounted on the ropes within the machine room or a built-in mechanical devices at the machine.
- .4 Supply and install on the speed governor a switch to activate the emergency brake.
- .5 The auxiliary emergency brake system must be installed in a location easily accessible for maintenance and be fixed.
- .6 Perform all test required by code and submit a list of the results to the *Departmental Representative*

2.6 MACHINE GUARDING

- .1 Design criteria:
 - .1 Design the guards according to the following rules of safety and functionality.
 - .2 Design the guards in a modular way allowing a simple and quick installation in different contexts of dimensions and spacing.
 - .3 Cage type guards are not acceptable.
 - .4 Ensure that the clearances between the guard and machine elements or other elevator or structural components allow easy and safe access for maintenance.
 - .5 The guard must be able to withstand at any point of its length, without flexing by more than 5 mm or permanent deformation, a force of 225 N (50 lbf) applied laterally to the element.
- .2 Supply and install machine guarding on the machine (traction sheaves / moving parts / moving cables) in conformance with CNESST requirements
- .3 Supply and install machine guarding on the auxiliary emergency brake in conformance with CSA requirements.
- .4 Supply and install machine guarding on any other moving parts in the machine room in conformance with CNESST requirements to protect workers against accidental contact.
- .5 The guards must meet or exceed the requirements of the CNESST and those identified in the B44.
- .6 Machine guarding must be designed and include wire mesh sections for proper ventilation to avoid overheating of equipment
- .7 Machine guarding should include easy opening access (door, removable portion or other) to allow preventative maintenance and testing of the elevator components.
- .8 The machine access must be opened and closed without using a tool (use easy operation fixation: butterfly screws, clamps or other spring devices).
- .9 Machine guarding should conform to the regulations:
 - .1 Act respecting occupational health and safety (AOHS)
 - .2 Regulation respecting occupational health and safety (ROHS)
 - .3 C21 Act on the criminal liability of organizations,

- .4 CSA Standard Z432-04 - Safeguarding of Machinery.

2.7 MACHINE ROOM INSPECTION UNIT

- .1 Supply and install near to each machine a yellow portable inspection unit for the operation in inspection speed with constant pressure control. Provide the following buttons
 - .1 Up (pressure maintained)
 - .2 In circuit (pressure maintained)
 - .3 Down (pressure maintained)
 - .4 Inspection (2-position selector - NORMAL / INSPECTION)
 - .5 Emergency stop (mushroom type)
- .2 Provide a sufficient length of mobile wiring cable to access all machine parts.
- .3 Provide a fixed location, easily accessible, on one of the walls to store the portable device and wind up the mobile wiring.
- .4 Provide the connection of the portable device to the controller.
- .5 The "Inspection" selector must be designed to prevent any accidental transfer from the "INSPECTION" position to the "NORMAL" position.
- .6 Make the inspection device inoperative if the controls for the inspection on the roof of the cabin or in the cabin or access to the shaft are activated, or if the bypass switch on the door or landing door the cabin is in the "BYPASS" position.
- .7 To make the inspection device operational, the "Inspection" switch located in the controller must be in the "INSPECTION" position.
- .8 With the device operating, the device's "Up and Down" commands must only come into play if the "Inspection" selector of the device is in the "INSPECTION" position and the "On" button is activated.
- .9 With the device operating, the safety circuit supplying the contactors must be open when the device selector is in the "INSPECTION" position and the "On" button is not activated.
- .10 Place a label on the back of the inspection device and the controller displaying the operating instructions. Example: "To use the inspection device of the driving machine, first set the" Inspection "switch located in the controller to the" INSPECTION "position.

2.8 HOIST ROPES

- .1 Replace existing hoist ropes with new steel hoist ropes as per new machine manufacturer specifications.
- .2 Select ropes based on the following criteria:
 - .1 The smallest possible degree of rope wear (thick wires, high wire tensile strength);
 - .2 A long rope life when running over sheaves (thin wires);
 - .3 Compatibility with the sheave (low wire tensile strength);
 - .4 The highest possible breaking strength (fewer or thinner ropes, high wire tensile strength);
 - .5 Low rope elongation due to rope shortening processes and ride comfort expectations (high metallic cross-section and top-quality fibre core).

- .3 Ensure that the load is equally divided on each rope. Retain existing shackles when conforming to Code.
- .4 Ensure that hoist ropes come from the same manufacturing batch.

2.9 TRANSFORMER

- .1 Supply and install a dry type transformer, copper windings, sprinkler proof box, conforming to CSA C22.2 No. 47, C9 and C802.2.
- .2 Seat the transformer of anti-vibration pads.
- .3 Provide the type factor $K = 13$ (as a minimum and according to the harmonic content of its equipment); The K factor of the transformer is determined according to the specifications of AINSI / IEEE C57.110 and its revisions.
- .4 Provide, in addition to technical sheets, calculation details of the transformer choice.
- .5 Three-phase dry-type transformers for non-linear loads will have the following characteristics:
 - .1 ANN type.
 - .2 Sprinkler proof enclosure.
 - .3 Class H (220) insulation with a winding temperature rises not exceeding 150°C .
 - .4 Dielectric insulation capable of withstanding a voltage of 1.2 kV.
 - .5 Impulse withstand voltage: 10 kV B.I.L.
 - .6 Equipped with four 2.5% sockets, including two FCAN and two FCBN.
 - .7 Ventilated enclosure type NEMA-2 (drip proof) or as indicated, equipped with lifting eyes and removable metal panels on the front and on the sides.
 - .8 Permanently identified primary and secondary voltage terminal strips with solderless connectors.
 - .9 Impedance varying from 3 to 5%.
 - .10 Neutral terminal (X0) on the secondary calibrated at twice the nominal phase current for connection to two neutral conductors in parallel.
 - .11 Finishing painting: Gray baked enamel ASA # 61.
 - .12 The grounding bar of the transformer must connect the box and the neutral (X0) of the transformer. Install four terminals for the cables, each with a capacity of 1.25 times the rated secondary current.
- .6 The transformer will be equipped with a primary winding connected in the delta in order to capture the currents of the triple harmonics (3, 9, 15, 21, 27, 33, 39, 45) generated by the load so that the ci is not transmitted to the primary power supply.
- .7 The design of the transformer must allow it to withstand the effects of non-linear loads.
- .8 The transformer will have a winding connected in a star to the secondary.
- .9 The transformer must withstand the following maximum operating conditions without overheating and without loss of life expectancy: 100% of the nominal load in kVA. Crest factors: 3.0.
- .10 One or more electrostatic screens between the windings attenuate the noise transmitted in "common" mode (line earth and neutral earth) and noise in "normal" mode (line line and line-neutral) at the transformer secondary.

- .11 Electrostatic screens must be connected to the transformer grounding bar and must allow the following attenuations:

- .1 Noise in "common" mode: -60 dB approximately.
- .2 Noise in "normal" mode: -20 dB per decade approximately.

2.10 DRIVE SYSTEMS - VVVF

- .1 Supply and install a variable voltage variable frequency system drive.
- .2 In series with the ac-motor, provide modular electronic inverters adequate for this type of installation, which includes a power control feedback.
- .3 Provide modular electronic inverters to vary the frequency and voltage controlled by an algorithm to optimize the system's performance.
- .4 Incorporate in these modular inverters devices to limit electrical noise to 5% of the nominal value.
- .5 The drive system must use a dual phase rectifier and a battery of capacitors to provide dc current to the electronic converter. The electronic converter must use a power Semiconductor and a utilization factor of frequency modulation fundamental not less than one kilohertz to synthesize output 3-phase variable voltage, variable frequency to operate the traction motor in an essentially synchronous mode.
- .6 The drive must be designed with high efficiency capable of providing sufficient voltage to accelerate the elevator to the nominal speed with the rated load. The drive must perform a speed regulation.
- .7 Provide a drive capable of providing an adjustable DC current to the motor for an adjustable time (0 to 1 second) in order to provide a braking pulse to use in the stopping sequence.
- .8 The drive must be able to adjust the curve or program voltage / frequency to match with the characteristics of the traction motor.
- .9 The controller must have a digital speed device adjustment.
- .10 The controller must have a stopping device when the command signal exceeds 5% of the nominal value.
- .11 The controller must provide acceleration and deceleration without bumps and a smooth operation at all speeds.
- .12 Provide filters to dissipate the produced heat.
- .13 Provide filters to limit audible noises to 70 decibels.
- .14 Mount all drive components on anti-vibration pads.
- .15 Supply and install EMIRFI filters type limiting harmonic current and voltage at the entrance of the power line in machine room.
- .16 The maximum total harmonic distortion when the elevator is in motion shall not exceed 10.0%, the measurement being made between phases or phase and neutral. The simple harmonic distortion maximum should not exceed 5%.

- .17 The maximum total harmonic distortion when the elevator is in motion shall not exceed 27.0%, the measurement being made between phases or phase and neutral. The simple harmonic distortion maximum should not exceed 22%
- .18 Provide a safety circuit to stop the elevator when the drive temperature exceeds 20% of the nominal operating value.
- .19 Provide circuits for departures on reduce current and limit in all cases the current basis for a maximum of 300% of normal operating current.
- .20 Provide circuits to limit the current supplied by the drive.
- .21 Paint all the non-machined metal surfaces.

2.11 CONTROLLER CABINET

- .1 House the controller in a metal cabinet with hinged doors.
- .2 Controller cabinet shall be NEMA Type 1.
- .3 Provide in the controller cabinet, two fans to ensure proper ventilation of the cabinet.
- .4 Provide the controller cabinet, lighting compact fluorescent type and an electrical outlet service unit.
- .5 Coordinate cabinet size according to available space.
- .6 Provide dimensions and layout of control devices at the beginning of the project for approval.

2.12 CONTROLLER

- .1 Remove existing equipment.
- .2 Supply and install a controller compatible with the variable frequency and voltage type drive system (VVVF drive).
- .3 The controller must be of the generic type.
- .4 Provide non-proprietary versions of all controller material including:
 - .1 The Contractor must submit with the deposit his bid, a letter certifying that the proposed material is entirely non-exclusive. All the diagnostic means required are "integrated";
 - .3 All programming and diagrams required for long-term maintenance must be supplied with the controller;
 - .4 Provide a written guarantee that software and firmware updates will be provided at no additional cost to the *Departmental Representative*, for the entire useful life of the equipment.
 - .5 The controller must not stop or change its functionality in any way after a predetermined increment of time or use;
 - .6 Any elevator contractor must be authorized to purchase parts, supplies, schematics, and support or training services directly from the factory at the same cost as the original installer. A published price list must be provided with the controller;

- .7 Parts, including circuit boards, should be able to be purchased directly from the factory in quantity and not just on a "one-for-one" basis.
- .5 Ensure redundancy of safety systems and power circuits as required by ASTM A17.1-2010/CSA B44-2010 Code.
- .6 Upon detection of a system failure or malfunction, the elevator will be stopped at the nearest floor and open its doors until a reset is done by a technician.
- .7 Provide a system that can normally operate in an ambient temperature range of 3°C to 40°C.
- .8 Insulate external signals, such as the hall and car calls, using optical devices. Do not use electromechanical relays for these circuits.
- .9 Provide a digital position indicator in the controller.
- .10 Provide a protection device against phase reversal and phase loss.
- .11 Provide a separate power supply for each printed circuit board.
- .12 Provide a ground connected in parallel to the building ground for each printed circuit board.
- .13 Do not install electronic boards near heat dissipating resistance.
- .14 Electromechanical relays used shall have a minimal lifespan of 25 years.
- .15 Make all connections to properly permanently identified terminals.
- .16 Properly identify relays, contactors, fuses and other components.
- .17 Provide an error-recording device with a capacity of 30 days reading.
- .18 Provide a digital clock with multiple programmable alarms.
- .19 Provide, permanently in the controller, all necessary tools (communication port for access) to view programming, fault identification and history.
- .20 Provide with the maintenance manuals, USB keys (or CD-ROM) containing the controller programming (reboot disk) and all related software.
- .21 Identify the applicable elevator code inside the cabinet.
- .22 Identify the controller using a number on the outside of the door.

2.13 CONTROLLER – INSPECTION AND TEST PANEL

- .1 Supply and install an inspection and test panel as required by ASTM A17.1-2010/CSA B44-2010 Code including among others the following items:
 - .1 Stop switch.
 - .2 Visualization panel as required in the article 2.7.6.4.1 of the ASTM A17.1-2010/CSA B44-2010 code providing the following information: position, direction of travel, operating status (stop/run), door status (open/closed), door unlocking zone, speed and operating mode (automatic / independent / recall).

- .3 Auxiliary power source (4 hours autonomy) for the visualization panel. Provide a monitoring system, if batteries are used, preventing the car from being restarted after a normal stop at a level.
- .4 «CAR DOOR BYPASS» and «HOISTWAY DOOR BYPASS» switches.
- .5 Devices for the manual reset of the detection means for ascending car overspeed protection and protection against unintended car movement
- .2 House the device in the controller cabinet

2.14 CONTROLLER - ACCESS CONTROL

- .1 Access control by the card reader in the car:
 - .1 Design the controller to connect with card readers access control system in the car.
 - .2 Provide terminals and connections in the controller to connect with existing access control system.
 - .3 Provide a location and connection interfaces in the car operating panel for a card reader access control system.
 - .4 Provide all the connection for the car reader access control system between interfaces supply by others and the controller.
 - .5 Provide access control operation in the elevator controller.
 - .1 The access control system will restrict car calls.

2.15 PROTECTION AGAINST ELECTROMAGNETIC FIELDS

- .1 Provide adequate immunity of electronic components against interference and influences due to the surrounding electromagnetic fields to eliminate any source of interference. The equipment shall comply with the standard EN12016 Part 2.

2.16 NOISE CONTROL

- .1 All rollers and guides shall be designed and adjusted for silent operation.
- .2 The door operation mechanisms shall incorporate resilient bumper in order to eliminate the impact sound when doors reach the end of their opening and closing movement.
- .3 Provide two flexible type connections to prevent contact between sections of metal pipes.

2.17 POSITION TRANSDUCER

- .1 Remove existing equipment.
- .2 Supply and install an electronic device to transmit position of the elevator cab to the controller.
- .3 Provide and install on the cabin roof a reader to count the number of perforations in the tape or the location of magnets.
- .4 Provide and install non-metallic trim guide slides on the cab roof to keep the tape facing the reader.
- .5 Ensure automatic levelling of the car at reduced speed in both up and down directions.

- .6 A levelling device with automatic correction in both directions must allow the car to remain level with the floor as long as the car is in the levelling zone.
- .7 Ensure a minimum accuracy of at least 5 mm at any position in the hoistway.
- .8 Ensure at least a reference reading at all levels.
- .9 Strobe devices are acceptable to the extent that the position of the car is controlled at all 5 mm.
- .10 Do not use electromechanical switches.

2.18 ELECTRIC WIRING - GENERAL

- .1 Remove existing equipment
- .2 Supply and install all the wiring to interconnect the elevator components.
- .3 Supply insulated multi-stranded ETT-type wiring having a 60°C flame-retardant and moisture-resisting outer cover.
- .4 Supply and install metal conduits (EMT) ducts or flexible conduits as needed to install all the wiring inside the machine rooms, hoistway or other spaces reserved for the installation of elevator equipment.
- .5 Supply and install wire protection when wiring comes into contact with a sharp surface that can damage the wire protective envelope.
- .6 Provide (15%) additional spare conductors, as a minimum in each cable.
- .7 Provide colour or number-coded conductors in multi-conductor cables.
- .8 Terminate cables on terminal blocks having identifying numbers.
- .9 Make no splices.
- .10 Spare wiring shall be properly identified, insulated and terminated on terminal blocks
- .11 All wiring must be CSA rated.
- .12 Ensure adequate protection of the travelling cable to avoid any contact against hoistway walls and structure.
- .13 Ensure that all circuits are properly grounded.
- .14 Install anti-shorts at wiring entry points within main control and junction box.
- .15 Supply, install and identify junction box for the communication systems, cameras, card readers and others.

2.19 ELECTRIC WIRING – TRAVELLING CABLE

- .1 Remove existing equipment
- .2 Supply and install travelling cable between the car and controller.

- .3 Supply and install travelling cable between the car and controller with the required wires needed by the elevator plus the following connectors: 6 shielded pairs 18 AWG, 3 twisted & shielded pairs for communication, 18 shielded pairs 20 AWG for the card reader, 1 coax cable (with RGU6 connector) at the centre of the travelling cable for a camera, 2 shield pairs 20 AWG for camera and 15% spares of each cable type.

2.20 HOISTWAY SWITCHES

- .1 Remove existing equipment.
- .2 Supply and install hoistway switches for a reliable and smooth operation without significant noise.
- .3 Dolly the switches following the proper adjustments.
- .4 Supply and install stop switches (mushroom type) in the pit connected in series. Install the first stop switches near the ladder at 450 mm above the floor level and a second stop switch near the ladder at 1200 mm above the pit floor if the pit is deeper than 1700 mm.

2.21 BUFFERS

- .1 Remove existing equipment.
- .2 Supply and install spring buffers in accordance with the requirements of the ASTM A17.1-2010/CSA B44-2010 code for the cab and the counterweight.
- .3 Supply and install a new steel base for the buffers.
- .4 Clean, brush and paint with a black epoxy paint all the non-machined metal surfaces.
- .5 Perform all tests required by codes and present the result list to the *Departmental Representative*.

2.22 PIT

- .1 Thoroughly clean and scrub the pit floor
- .2 Paint the pit floor with light gray water-based polyurethane (odourless) paint.
- .3 Paint all pit equipment black on a minimum height of 914 mm with water-based polyurethane (odourless) paint.
- .4 Paint the refuge area (600 mm x 1220 mm) with black and yellow line on the pit floor.
- .5 In any area in the pit, outside the refuge space, where the vertical clearance is less than 600 mm shall be clearly marked on the pit floor as specified by section 2.4.1.6 of ASTM A17.1-2010/CSA B44-2010 code.

2.23 HOISTWAY

- .1 Chamfer any surfaces which project more than 100 mm inside the hoistway with steel sheets to obtain a bevel of 75 deg with respect to the horizontal, as required by ASTM A17.1-2010/CSA B44-2010 code.

2.24 GUIDE RAILS

- .1 Retain existing equipment.
- .2 Check and correct the tightness of all rail anchors and bolts of all rail joints.
- .3 Clean and brush the machined guide rail surfaces to ensure adequate rolling surface without irregularity and paint in black all non-machined surfaces.
- .4 Clean rails along the entire height of the hoistway to eliminate any presence of oil.

2.25 RIDE QUALITY

- .1 The variation between the car guide rails should not exceed ± 1 mm on a vertical distance of 30 m.
- .2 Clean and brush the machined surfaces of the rails to ensure a smooth ride.
- .3 Check the rail joints and polish all horizontal deflections.

2.26 GUIDES: CAR & COUNTERWEIGHTS

- .1 Remove existing equipment.
- .2 Supply and install simple roller guides with a minimum diameter of 150 mm equipped with stop notches installed in the lower and upper parts of the car frame.
- .3 Supply and install single roller guides with a minimum diameter of 75 mm equipped with stop notches installed in the lower and upper parts of the counterweights frame.
- .4 Supply roller guides equipped with durable neoprene roller wheel.
- .5 Supply roller guides with a tension device on three faces ensuring wheels contact at all times on each side of the rail.
- .6 Adjust the roller guides to maintain a slight tension in the guide rails.
- .7 Use a soft material that will not sag after remaining idle for a period of 24 hours under normal operation conditions.

2.27 FASCIAS PLATES

- .1 Retain existing equipment.
- .2 Clean, brush and paint, with a black water-based polyurethane paint (odourless), the fascia plates
- .3 Properly identify with large markings each floor on fascia plates.

2.28 COUNTERWEIGHTS

- .1 Retain existing equipment.
- .2 Check the existing balance before starting work and transmit the information.
 - .1 Measure the existing mass of the car and the counterweight.

- .2 Also provide the information available on the cabin nameplate (cabin mass) as well as the dimensions of the counterweight for evaluation of its mass.
- .3 Check and calibrate the counterweight at the car dead weight plus 40 to 42% of capacity.
- .4 Add any additional mass necessary after the installation of new cab finishes.
- .5 Ensure the counterweight is balanced by the static position.
- .6 Provide temporary spacer blocks under the counterweight to offset the elongation of the ropes.
- .7 Provide and install a new up-to-date nameplate on the cabin roof following the work. Keep the old nameplate.
- .8 Indicate the clearance on the counterweight protector in the pit.
- .9 Paint the counterweight with an acrylic yellow colour.

2.29 CAR PLATFORM AND FRAME

- .1 Remove existing equipment.
- .2 Supply and install a new sub floor made of two (2) plywood sheets (marine grade) 19 mm thick, fully fireproofed, secured in place (glued & screwed every 150 mm) using mechanical flush fasteners and supported by steel beams.
- .3 Balance the car near the static position.
- .4 Provide insulation 30 mm rubber pads between the car and the upper part of the frame to allow the free movement of the cab.
- .5 Paint all non-machined metal surfaces.
- .6 Clean, brush and paint, with a black water-based polyurethane paint (odourless), all equipment.

2.30 PLATFORM GUARDS - TOE GUARD

- .1 Supply and install a platform guard (toe guard) with a straight vertical face extending below the floor surface of the platform for a minimum of 1220 mm as required by section 2.15.9 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Paint the plate in yellow.

2.31 SAFETIES - CAR

- .1 Remove existing equipment.
- .2 Supply and install car safeties rated for the equipment load and speed.
- .3 Ensure that all components of the safeties are rust-free and well lubricated.
- .4 Perform all the tests required by codes and authorities and submit a report to the *Departmental Representative*.

2.32 GOVERNORS – CAR

- .1 Remove existing equipment.
- .2 Supply and install an automatic reset overspeed governor to operate the parachutes according to code requirements.
- .3 Choose a governor suitable for the dimensions of the top of the hoistway.
- .4 Supply and install an electric switch on the overspeed governor to cut the motor power before the safeties are activated.
- .5 Supply and install a new tension sheave in the pit.
- .6 Supply and install a new cable for the governor.
- .7 Ensure that all components of the overspeed devices are rust-free and well lubricated.
- .8 Perform all the tests required by codes and authorities and submit a report to the *Departmental Representative*.

2.33 INSPECTION UNIT

- .1 Supply and install an inspection unit on the car top of the operation in inspection speed with constant pressure control.
- .2 Supply and install a LED protected light bar equivalent to 15 W minimum (equivalent of 100 Watts incandescent). The illuminance level measured at the farthest point to be inspected will be at least 100 lx.
- .3 The device shall be permanently located on top of the car and readily accessible from the landing to the maintenance technician.

2.34 CAB

- .1 Remove existing cab finishes.
- .2 Remove existing metallic cab shell and 2 438 mm high.
- .3 Supply and install a 16 gauge, 2 438 mm high metal cab.
 - .1 Ensure solid construction of the cab shell using external profiles in sufficient numbers.
 - .2 Interior walls: panels made of sheet steel, attached to the car frame and platform.
- .4 Supply and install a roof made of reinforced steel sheet to support the weight of the equipment and the two mechanics.
- .5 Supply and install a metal guard rails at all edges (on the 2 sides without door) of the roof as required ASTM A17.1-2010/CSA B44-2010 code. Position the guard to optimize space on the roof of the cab.
- .6 The cab shall meet ASTM A17.1-2010/CSA B44-2010 code requirements.
- .7 Wall:
 - .1 See architectural plans for new finishes to supply and install.

- .2 Not used .
- .3 Provide the necessary ventilation opening.
- .4 Supply and install one set of protective cushions per cabin to cover vertical cabin surfaces as well as stainless steel fasteners on all cab walls.
- .8 Handrails:
 - .1 Supply and install handrails as shown on the architectural plans.
 - .2 Provide enough fasteners to ensure a solid construction.
 - .3 Ensure a minimum clearance of 51 mm between the handrail and the finish.
- .9 Bumpers:
 - .1 Not used
- .10 Ceiling:
 - .1 See plans for new finishes to supply and install..
 - .2 See plans for lightning to supply and install on the ceiling of the cab. The lighting system must be sufficient to provide a consistent light intensity of 215 lx, measured at 0.75 m above the floor
 - .3 Include an emergency exit from the ceiling. Provide a sliding system for handling the panel under the emergency exit. Submit panel and mechanism drawings for approval.
 - .4 Ensure that no anchor or fastener exceeds the car roof.
 - .5 Supply and install a two-speed electric air exhaust fan, with a capacity of 200 litres per seconds and producing no more than 55 dBA at low speed. Provide a dimmer located on the cab roof to modulate high speed.
- .11 Floor:
 - .1 See plans for new finishes to supply and install.
- .12 Door:
 - .1 Supply and install a stainless steel 24 ga, no4 finish car door. Polishing shall be vertical.
 - .2 Supply and install an extruded nickel silver cab door sills with wearing non-slip surface.
 - .3 Supply and install door nylon gib.
 - .4 Supply and install all equipment required for a durable and efficient system operation.

2.35 CAR DOOR EQUIPMENT

- .1 Remove existing equipment.
- .2 Supply and install a heavy-duty type closed-loop variable speed and torque control door operator rated at speed of 910 mm per second.
- .3 Supply and install a car door clutch.
- .4 Supply and install car interlock.
- .5 Supply and install a door lock to restrict the opening of the car door from the inside when it is outside the unlocking zone as required by article 2.12.5 of ASTM A17.1-2010/CSA B44-2010.

- .6 Supply and install all equipment doors needed for a durable and efficient system operation.
- .7 Supply and install a new suspension rail fitted with rubber bumpers. Rail shall be easy to replace.
- .8 Supply and install two suspension rollers per door panel with a minimum diameter of 75 mm.
- .9 The suspension rollers shall be made of material designed to retain lubricant and be equipped with cleaning felt.
- .10 Provide on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.

2.36 HALL DOOR EQUIPMENT

- .1 Remove existing hall door equipment (hanger track / hanger sheaves / pickup rollers / interlock / door closer).
- .2 Supply and install all door equipment needed for a durable and efficient system operation.
- .3 Supply and install new hanger tracks at all levels. The hanger tracks must be fitted with stoppers. The track should be of an easy-to-replace model.
- .4 Securely fix the tracks to the building frame.
- .5 Supply and install two hanger sheaves per door panel with a minimum diameter of 75 mm. The hanger sheaves shall be made of material designed to retain lubricants and be equipped with cleaning felt.
- .6 Supply and install a complete new hall door interlock system (interlock and opening mechanism) at all floors.
- .7 Supply and install a ground connected on all interlocks.
- .8 Supply and install new door spring closer at all floors.
- .9 Remove existing hall door panels and retain hall door frames and do the following work:
 - .1 Remove existing door panels.
 - .2 Supply and install new stainless steel no4 finish hall door panels. Polishing shall be vertical.
 - .1
 - .2 Supply and install door astragals;
 - .3 Supply and install lower door guides;
 - .4 Supply and install fire retaining metal guides at the lower and upper part of the doors.
 - .5 Supply and install on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.
 - .3 Retain hall door frames
 - .1 Clean and polish the frames by a polishing specialist all the landing door frames to give a new appearance.
- .10 Correctly align the hall door panels.

- .11 Provide on the structural upright of the landing entrance, an adjustable rubber stopper to limit the travel of the door beyond the normal opening.
- .12 Clean the existing sills.
- .13 Provide on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.

2.37 HOISTWAY DOOR UNLOCKING DEVICES

- .1 Supply and install a hoistway door unlocking devices at all floors as required by section 2.12.6 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Supply and install aluminum trim rings at all levels.

2.38 HOISTWAY ACCESS SWITCHES

- .1 Supply and install a hoistway access switches at the bottom & top floor as required by section 2.12.7 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Integrate this switch in the door frame or in the hall station unit.
- .3 Plan to close the opening of the old device with a 12 gauge stainless steel plate, if applicable.

2.39 HALL CALLS STATIONS

- .1 Remove existing equipment.
- .2 Supply and install surface mount fixtures on a low-profile enclosure (max 25 mm) elongated on the surface with rounded edges of robust anti-vandalism type (stainless steel / stainless steel) with compact contact module (illuminated in red) type LED, luminous at its perimeter at each landing.
 - .1 Each button will become a high intensity when the button is pressed (one intensity model).
- .3 Provide on the main floor call station the following items:
 - .1 Visual fire hat signal <hidden legend>, LED type, for Phase I Emergency Recall Operation;
 - .2 A three-position key-operated switch (group 3) labelled "FIRE RECALL" and its positions marked "RESET – OFF – ON" (in that order). The letters shall be a minimum of 5 mm high in red.
 - .3 Visual signal for Emergency Power Operation <hidden legend>, LED type, to indicate that the lift is supplied with the emergency power supply.
- .4 Provide a hoistway access switch as required by code. Insert the switch in the hall stations or door frames.
- .5 The LED lights used in call stations shall have a useful life of at least 100 000 hours.
- .6 Provide all plates in stainless steel 304 no4 finish.
- .7 Engrave all required markings, in French & English language, directly on the plates, as per ASTM A17.1-2010/CSA B44-2010 code.

- .8 Provide fireproof and / or acoustic seals around the various electrical conduits.

2.40 HALL POSITION INDICATOR

- .1 Supply and install a digital position indicator at all floors. Characters shall be 50 mm high.
- .2 Install position indicator in hall stations.
- .3 Provide a # 4 stainless steel cover plate on low-profile enclosures (max 25 mm) with rounded edges.

2.41 HALL DIRECTION LANTERN

- .1 Supply and install a direction lantern, raised arrow type, with electronic gong at each car door jamb.
- .2 When the car is within a certain distance of a floor where it should stop, the direction lantern must illuminate with tone sounds to indicate the direction of the car.
- .3 The lantern must remain illuminated until the car leaves the floor.
- .4 In Up direction, the tone must ring once, and in Down direction, the tone must ring twice.
- .5 Include an adjustable gong tone device.
- .6 Provide No. 4 finished stainless steel plates.

2.42 CAR OPERATING PANEL - MAIN

- .1 Supply and install one (1) car operating panel, mounted on invisible hinge, in stainless steel finish No. 4 integrated in the car front return as per the requirements of ASTM A17.1-2010/CSA B44-2010 code and the following requirements:
- .1 Illuminated heavy-duty vandal-proof pushbuttons (steel/steel) , with compact contact modules, red LED illuminated push button with integrated Braille tag corresponding to floors served.
- .2 Each button will become a high intensity when the button is pressed (one intensity model).
- .3 Door open button labelled "OPEN" and door closer button labelled "CLOSE".
- .4 Alarm button, with a raised ring with integrated Braille tag,
- .5 Emergency button, with a raised ring, with a phone symbol labelled "PUSH TO CALL" above and "HELP" below button. The button light will remain permanently on a low intensity (white) and become a high intensity (red) when the button is pressed (model with two colours (white / red) and two intensities).
- .6 Visual indication located in the upper part of the car operation panel to acknowledge that two-way communications link has been established labelled, "COMMUNICATION ESTABLISHED".
- .7 Visual fire hat signal for Phase I Emergency Recall Operation;
- .8 Visual signal for Emergency Power Operation <hidden legend>, LED type, to indicate that the lift is supplied with the emergency power supply.
- .9 A red LED light <hidden legend> indicating the activation of the independent service operation marked independent service.

- .2 Supply and install a firefighters' operation cabinet (as per section 2.27.3.3.7 of ASTM A17.1-2010/CSA B44-2010 code), at the top of the car operating panel, with the following items:
 - .1 A three-position key-operated switch (group 3) labelled "FIRE OPERATION" and its positions marked "OFF – HOLD – ON" (in that order). The letters shall be a minimum of 5 mm high in red. It shall become effective only when Phase I Emergency Recall Operation is in effect and the car has been returned to the recall level.
 - .2 A button labelled "CALL CANCEL" which shall be effective during Phase II Emergency In-Car Operation. When activated, all registered calls shall be cancelled and a travelling car shall stop at or before the next available landing.
 - .3 Door open and close buttons;
 - .4 A "RUN" / "STOP" switch
 - .5 Visual signal for Phase I Emergency Recall Operation;
 - .6 A descriptive plate with marking shown in figure 2.27.7.2 of ASTM A17.1-2010/CSA B44-2010 code.
 - .7 The cabinet door access key must be the same as phase II switch.
 - .8 The cabinet door must lock automatically when the door is closed.
- .3 Supply and install a service cabinet at the bottom of the car operating panel, locked by a key switch with the following items:
 - .1 Stop key switch with marling <STOP / RUN>
 - .2 Independent service key switch;
 - .3 Light switch;
 - .4 Emergency light test switch;
 - .5 Fan key switch;
 - .6 Hoistway access key switch.
- .4 The LED lights used in car operation panel shall have a useful life of at least 100 000 hours.
- .5 Engrave all required markings directly on the plates.
- .6 Provide all plates in stainless steel no4 finish.
- .7 Supply and install a digital position indicator on the car operating panel. Characters shall be 50 mm high. The unit must have direction arrows.

2.43 CAR INTERCOMMUNICATION SYSTEM

- .1 Supply and install a hands-free phone in each elevator to establish two-way communication between the car and a location in the building and in accordance with section 2.27.1.1 of CAN/CSA-B44-10 code. This place shall be readily accessible to authorize and emergency personnel. The phone must include the following items:
 - .1 An emergency push button labelled "HELP".
 - .2 A visual indication on the same panel as the "HELP" push button to acknowledge that two-way communications link has been established.
- .2 Supply and install wiring to connect the car phone system to the controller in the machine room.

- .3 The devices shall be easily remote programmable. Access to the program shall be protected by a code.
- .4 The phone will automatically dial the programmed number when the "HELP" push button is pressed. If that number is busy, a second number can be programmed.
- .5 The communication should be clear and without parasites anywhere in the cab and can also be initiated from an external telephone.
- .6 Ensure that all circuits are properly grounded.
- .7 Provide the location and holes in the car operating panel.

2.44 VOICE SYNTHESIZER

- .1 Supply and install a voice synthesizer in each car.
- .2 The system will announce the floor of arrival before opening the doors.
- .3 The system must be able to store 40 customized messages (8 seconds each) for a total or 5 minutes of capacity.
- .4 The speaker system shall be at least 0.5 Watts and 8 Ohm type.
- .5 The microphone for recording messages must be 1 K Ohm type with minimum sensitivity of 64 dB.
- .6 The device must be easily programmable. The memory access must be coded protected.
- .7 Install the system so that the message is clear and noise free anywhere in the cab.
- .8 Submit a list of proposed messages for approval to the *Departmental Representative*.

2.45 CAR EMERGENCY LIGHT

- .1 Supply and install an emergency lighting unit, in the car operating panel, with autonomy of 4 hours, designed for this application.
- .2 The unit will produce an instant lighting when normal power is lost.
- .3 The emergency lighting unit must provide a general brightness of 22 lux in the cab at a distance of 1200 mm.
- .4 Supply and install a sealed rechargeable battery and powered by the normal current.

2.46 DOOR PROTECTION DEVICE

- .1 Supply and install a multibeam infrared door protection device.
- .2 The detection field shall start at a maximum of 150 mm from the floor and extend up to a maximum of 300 mm from the top of the entrance.
- .3 The system must remain operational until a failure of 10% of the infrared rays. A light shall indicate the device failure. In case of failure, deactivate the nudging except for emergency recall.

- .4 The door shall reopen completely when the door protection devices are activated.
- .5 Arrange that when the door protective devices are activated for more than 20 seconds continuously, a nudging buzzer signal is activated

2.47 ENGRAVING

- .1 Identify the elevator at the main floor with a number 75 mm in height. This number should be engraved on a stainless steel plate.
- .2 Identify the elevator with engraving on the car operating station.
- .3 Identify all equipment parts located in machine room as well as the car frame and counterweight screen.
- .4 Identify the refuge areas on the car top.
- .5 Supply and install Arabic numerals and Braille markings designating levels on the two doorframes hall entrance. The bottom of the numbers shall be at 1525 mm from the floor. At the main floor, a star shall be supplied in addition to the identification requested.
- .6 Provide all other inscriptions required by authorities.
- .7 All engraving shall be in French & English language.
- .8 All inscriptions should be engraved to a minimum depth of 0.25 mm on the metal surfaces of the fixtures.

2.48 KEYS

- .1 Provide a minimum of 6 sets of keys clearly identified for the operation of the emergency recall and special emergency service key switches.
- .2 The various switches and keys shall meet the requirements of the Elevator Code.
- .3 Any item referring to locks / keys " FIRE OPERATION " for "fire recall" phase I and II: These locks / keys group 3 must be provided by the contractor and will be of the universal model recognized as the "FEO-K1" .

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with the manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Install hoistway, machine room, and other elevator materials and components in accordance with ASTM A17.1-2010/CSA B44-2010, local codes, regulations and manufacturers' written instructions.

3.3 FIELD QUALITY CONTROL

- .1 Verification requirements include:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Recycled content.
 - .6 Local/regional materials.
 - .7 Certified wood.
 - .8 Low-emitting materials.

3.4 SITE TESTS

- .1 Perform and meet tests required by ASTM A17.1-2010/CSA B44-2010.
 - .1 Submit test data forms in accordance with Section 01 91 13 16 - Commissioning Forms before requesting an inspection by the *Departmental Representative*.
 - .2 Perform real time testing of Emergency Operation (Emergency Recall Operation - Phase I & Emergency In-car Operation - Phase II) and emergency power operation with *Departmental Representative*.
- .2 Supply instruments and execute specific tests.
- .3 Furnish test and approval certificates issued by jurisdictional authorities.
- .4 At agreed time during twelve-month warranty period, and with building normally occupied using normal building traffic, conduct tests to verify performance. Furnish event recording of hall call registrations, time initiated, and response time throughout entire normal working day.

3.5 CLEANING

- .1 Remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components ready for inspection.

3.6 ADJUSTMENTS

- .1 Adjust door opening and closing times to suit handicapped users in accordance with *Departmental Representative* instructions.
- .2 Adjust control system to cause elevators to answer hall calls during working days within performance criteria specified.
- .3 Adjust for smooth acceleration and deceleration of the car as so not to cause passenger discomfort.
- .4 Adjust automatic floor levelling features at each floor.

3.7 SCHEDULE OF WORK

- .1 The work shall be coordinated with *Departmental Representative*.

3.8 SEQUENCE OF WORK

- .1 Schedule the modernization sequence in accordance with Section 01 14 00 - Work restrictions.
- .2 Schedule a maximum of 6 weeks per elevator for modernization works.
- .3 The final sequence of work must be submitted before the start of work for approval by *Departmental Representative*.

3.9 DISMANTLEMENT

- .1 Coordinate equipment dismantlement with *Departmental Representative*.
- .2 Machine Room: Dismantle the machine, the control cabinets, wiring, floor selectors, governors and any other replaced or no longer needed equipment.
- .3 Hoistway: Dismantle cab finish, mobile and fixed wiring, hoistway switches, landing door equipment, and any other replaced or no longer needed equipment.
- .4 Following dismantlement, dispose of equipment in accordance with Section 01 74 19.

3.10 INSERTING AND REMOVING EQUIPMENT

- .1 The Contractor is responsible for the insertion and removal of the equipment described in this section.
- .2 The contractor is responsible for providing all equipment necessary for insertion, handling and installation of the equipment in the machine room or in the hoistway.
- .3 Access to the machine room is from the corridors and stairways of the building.
- .4 The Contractor is responsible for verifying the paths and provide equipment to meet the dimensions of access constraints.
- .5 No new opening will be made in the machine room.

3.11 WELDING WORK

- .1 If welding works are required on the site, obtain all necessary approvals by *Departmental Representative* before performing the works.
- .2 All site welds must be made by a qualified welder and identified with his identification mark.

3.12 TOUCH UP WORK

- .1 Ensure that all exposed metal surfaces are painted.
- .2 At the end of the work, retouch and repair all finished surfaces assembled at the factory, where the finish is altered or damaged.
- .3 Repair or replace any damaged item, without charge, before the substantial completion of work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Related sections
 - .1 Section 14 00 00 – Additional General Conditions

1.2 SYSTEM DESCRIPTION

- .1 Modernize the existing elevator as described in the following tables and the requirements of this section:
 - .1 (1) existing traction elevator (No. 1) with geared traction machine located in the machine room on top of the hoistway.
- .2 The following requirements must be met for all elevators described in this section:
 - .1 Barrier-Free in accordance with CAN/CSA B651-18, Barrier-Free Design.
 - .2 Bilingual Markings:
 - .1 Provide identification and instructions on operating panels and on signal equipment in English and French except where design is such that inference is obvious and readily understood.
 - .3 Retain existing car speed and capacity.
 - .4 Provide equipment to suit the existing hoistway and machine room dimensions.
 - .5 Check all dimensions on the site.
 - .6 Design and modernize the elevator in accordance with ASTM A17.1-2010/CSA B44-2010, local codes and regulations.

.3 Existing system – Elevator #2

System BEFORE modernization:

Unit number :	2
Designation :	Passengers
Installation date :	1970
Floor served :	2 stops, 2 front exit : SS, 1,
Nominal speed :	↑↓ 0,25 m/s
Capacity :	1 361 kg
Machine manufacturer :	Otis
Machine type :	Basement traction machine / 1:1
Motor manufacturer :	Otis
Motor type :	AC, 6,0HP, 7,8A, 600 V
Controller manufacturer :	Otis
Controller type :	Relay
Dispatch type :	Simplex
Ropes :	5 of 12,7 mm
Door type :	Side opening / (2) speed
Door size :	1 372 mm X 2 134 mm
Door fire rating:	None
Cab size :	1 575 X 1 969 X 2 463 mm

Car equipment description

Fixture

Position indicator	Analog
Car lantern	Not Provided
Arrival gong	
Floor gong	
Voice synthesizer	Not Provided
Button - height	Not Conform
Button - model	Otis
Braille	Not Provided
Independent service	Not Provided
Emergency In-car Operation	Not Provided
Communication system	Provided (hand set)

Equipment

Emergency light	Provided
Door protection	Mechanical
Handrail	3 sides
Handrail - height	Not Conform
Door operator	Otis
Interlock	Otis
Car guides	Swivel
Inspection unit	Not Conform
Refuge area	Provided

Hall equipment description

Fixture

Position indicator	Analog
Hall lantern	Not Provided
Gong	Not Provided
Button - height	Not Conform
Button - model	Otis
Braille	Not Provided
Emergency Recall	Not Provided
Operation	
Emergency power	Not Provided

Equipment

Interlock	Otis
Door track	Otis
Door closer	Weight
Door fire pin	
	Bottom
	Top
Mechanical access	Provided
Electrical access	Provided (SS, 1)
	Not Conform

1.3 PERFORMANCE REQUIREMENTS

- .1 Codes and Regulations
 - .1 Design, supply and install all equipment in accordance with the latest editions of the ASTM A17.1-2010/CSA B44-2010 Code (update included), CAN/CSA-B651-18 Code and any other federal, provincial and municipal regulations applicable for this type of installation, including the National building Code of Canada and the Quebec Electrical Code.
- .2 Driving Force
 - .1 Equipment driving force must comply with existing systems. In the case of non-compliance of the driving forces, the Contractor shall assume all costs associated with this change (electrical, air conditioning, etc.).
- .3 Controller
 - .1 Provide Simplex Collective Selective microprocessor controls.
 - .2 Elevator controller systems must not be equipped with a programmable logic controller and must be generic types.
- .4 Hall Calls
 - .1 Elevators to answer hall calls during working days; within following times:
 - .1 38% of calls within 10 seconds maximum.
 - .2 63% of calls within 20 seconds maximum.
 - .3 80% of calls within 30 seconds maximum.
 - .4 88% of calls within 40 seconds maximum.
 - .5 93% of calls within 50 seconds maximum.
 - .6 95% of calls within 60 seconds maximum.
- .5 Call Sequence
 - .1 Provide a control system managing car and hall calls in ways to minimize overall average waiting time.
 - .2 Upon arrival at the destination floor, the call must be cancelled.
 - .3 Do not permit registration of car calls behind the running position of an elevator.
 - .4 Cancel all car calls in the situation of excessive car calls according to cab occupation.
- .6 Direction Sequence
 - .1 The elevator starts when one or more car or hall push buttons are activated, other than the one where the elevator stands. The cab stops at the first call from a cab or hall depending on the travelling direction.
 - .2 The elevator should answer all car and hall calls; it should stop at every called floor, in numerical order, depending on the travelling direction. The call should have been made some time before the elevator gets to this floor.
 - .3 If no order from the cab has been made, the cab travelling in the up direction to answer calls for down direction should stop at the top floor where a call has been registered, reverse elevator direction, and answer all floors requested, in decreasing numerical order. The opposite should occur when the elevator is travelling down to answer up calls.
 - .4 The elevator answering a car call will be designated to answer the hall call at this level in the opposite direction given this elevator has not been assigned more call in its direction of travel.

- .7 Parking
 - .1 Not Used
- .8 Fault recovery
 - .1 Recall an elevator to the nearest floor and open door when an operation fault is detected within the system.
- .9 Pre-opening
 - .1 Provide advance opening operation of the car doors.
 - .2 Ensure that the door will initiate the opening cycle at a maximum of 75 mm from the landing floor.
- .10 Speed Control System
 - .1 Ensure that the average acceleration is not less than 0.60 metres per square seconds and not exceeding 1.1 metres per square second.
 - .2 Ensure that the rate of change in acceleration does not exceed 1.8 metres per cubic second.
 - .3 Ensure that the car stop and start smoothly.
- .11 Door Operation
 - .1 Provide smooth door open and close cycle.
 - .2 The doors shall open automatically when the car arrives at a landing floor.
 - .3 The doors shall reopen when the door protective devices are activated.
 - .4 Arrange that when the door protective devices are activated for more than 20 seconds continuously, a nudging buzzer signal is activated
 - .5 Arrange that and the door closes at reduced torque and speed when the door protective devices are activated for more than 20 seconds.
 - .6 The door speed must be reduced in half when the doors are closing and the reopening device has been rendered inoperative by the fire recall.
- .12 Performance levels
 - .1 Design and adjust the equipment to meet the following performance levels:
 - .1 Operating time shall be as follows. Measure from the time doors closing cycle begins until doors are three quarters opened on the next floor, assuming a maximum floor height of 4000 mm.
 - .1 Up: 14.5 seconds
 - .2 Down: 14.5 seconds
 - .2 Door open and close time equal to values shown below.
 - .1 Open: 3.0 seconds
 - .2 Close: 4.0 seconds
 - .3 Doors dwell time in response to a car or hall calls equal to values shown below.
 - .1 Car call : 2.0 seconds
 - .2 Hall call : 3.0 seconds
 - .4 Speed variation shall not exceed 5% of nominal value.
 - .5 Door noise levels shall not exceed +6 dBA higher than ambient noise.
 - .6 Car running noise levels shall not exceed +6 dBA higher than ambient noise.

- .7 Machine room noise levels shall not exceed 75 dBA, as measured when one elevator is running.
- .13 Levelling
 - .1 Ensure automatic levelling of the car at reduced speed in both up and down directions.
 - .2 The automatic levelling will be made with the accuracy of 6 mm unrelated to the car load.
 - .3 The levelling of the car sill compared to hall sill should not exceed +/- 6 mm in either direction as long as the car is in the levelling zone.
- .14 Independent service
 - .1 Provide in-car independent service operation.
 - .2 Cancel door protective device operation.
 - .3 Cancel hall button operation.
 - .4 Cancel hall lanterns operation.
 - .5 When the car is parked doors must remain open.
 - .6 Elevator will be controlled only from inside the car.
 - .7 Elevator may respond to the car calls only once the full closing of the door, by maintaining a constant pressure button "CLOSE" or the button corresponding to the desired level.
 - .8 Arrange that the doors will reopen if the door "CLOSE" button is released prior to elevator motion.
- .15 Emergency Operation
 - .1 Provide Emergency Recall Operation - Phase I in accordance with ASTM A17.1-2010/CSA B44-2010 Code.
 - .2 Provide Emergency In-car Operation - Phase II in accordance with ASTM A17.1-2010/CSA B44-2010 Code.
- .16 Emergency Power Operation
 - .1 Emergency power will be available for the elevator.
 - .2 Provide Emergency Power Operation in accordance with ASTM A17.1-2010/CSA B44-2010 Code and as describe below.
 - .1 Two signals indicating the normal and emergency power connecting dry contact relay will link the transfer switch and the controller. A pre-transfer signal will be given by these signals.
 - .2 A normally close circuit will be open when normal alimentation is lost. When it's open, recall the elevators sequentially (1 elevator per group) to the recall level and open the door.
 - .3 Not used
 - .4 Once the sequence recall is complete, elevators must run automatically on emergency power as follows:
 - .1 Elevator No. 1: elevator will remain available on emergency power for public use.
 - .5 Not used
 - .6 Not used
- .17 Car intercommunication system
 - .1 Provide connection to the existing bilateral intercommunication system.

- .2 If the intercommunication system is normally connected to the building power supply, it shall automatically transfer to a source of standby or emergency power after the normal power supply fails. The power source shall be capable of providing for illumination of the visual indication within the car, and the intercommunication system for at least 4 h
- .18 Access control
 - .1 Design the controller to connect with a card reader access control system in the car as defined in the following section.

Part 2 Products

2.1 MACHINE – GEAR TRACTION SYSTEM

- .1 Remove the existing machine and sheaves.
- .2 Supply and install a geared traction machine located in the machine room on top of the hoistway.
 - .1 Provide traction sheave of 635 mm minimum
 - .2 Provide hoist cables with a minimum diameter of 12,7 mm
 - .3 Provide a 1:1 arrangement .
- .3 Choose a machine suitable for the dimensions of the machine room as well as the existing accesses. No new opening will be made by the *Departmental Representative* as part of the work to provide access to the machine room.
- .4 Retain the existing foundation beams
- .5 Supply and install a new steel base for the machine duly anchored to the existing structure of the building.
- .6 Provide all the necessary anchors for the installation of the base on the floor of the machine room.
- .7 Supply and install any new support beams required in the machine room and / or at the top of the shaft for the machine and the deflection pulleys of the car and the counterweight.
- .8 Supply and install new deflection sheave (including support and bearing) in the machine room and / or in the hoistway for guiding the hoist cables of the car and the counterweight.
- .9 Provide a machine with a mechanical efficiency greater than 80%.
- .10 Limit horizontal gap and gear gap to a maximum of 0.125 mm at balanced load
- .11 Provide traction sheave with depth grooves equal to 3/4 of the rope diameter.
- .12 Provide pulleys equipped with cable retainers and greasable bearings.
- .13 Seat the machine on high performance anti-vibration pads.
- .14 Paint all the non-machined metal surfaces.
- .15 Identify the machine with a number.

2.2 MACHINE - MOTOR

- .1 Provide a motor force complying with the values given in tables of section 1.2 of these specifications and meet the existing electrical inputs.
- .2 Provide a new alternative current motor with a permanent magnet in series with the electronic control transformer.
- .3 Provide a low slip motor type with a maximum temperature of 50°C and minimum class B insulation.
- .4 Provide circuits to limit the current fed in the motor and motor overheat.
- .5 Ensure that the machine and motor are properly balanced and aligned so that vibrations at the end of the motor are not exceeding 0,025 mm at the end of the motor. This work must be carried out by a company specializing in the field following the insertion of the machine into the machine room.

2.3 MACHINE – BRAKE SYSTEM

- .1 Provide a disc brake type device.
- .2 Provide an electromechanical brake system to allow the car to stop normally, at full capacity, when power is interrupted
- .3 Ensure that the brake system will hold 125% of the rated capacity.
- .4 Secure with pins the position of the final adjustment of the brake spring
- .5 Supply and install a monitoring brake switch preventing movement of the car in the following situations:
 - .1 Brake does not open.
 - .2 Brake does not close.
 - .3 Excessive wear of brake pads that may affect the brake operation.
 - .4 Excessive gap that can affect the brake operation.

2.4 MACHINE – SPEED CONTROL SYSTEM

- .1 Supply and install an electronic feedback speed control system, including the following items:
 - .1 A tachometer linked to the machine shaft to provide reading of elevator speed;
 - .2 This encoder shall have an optimal reading range exceeding 20% of the minimum elevator speed;
 - .3 A microprocessor-based speed regulator system reading speed input and generating corrective output signals;
 - .4 Safety circuits to stop the elevator when the acceleration exceeds by 20% the required acceleration and when the speed exceeds by 5% the required speed.

2.5 AUXILIARY EMERGENCY BRAKE (ROPE BRAKE)

- .1 Provide auxiliary brakes as per code and the following:
 - .1 Brakes shall apply when up speed exceeds 110% of nominal speed. The brake must be manually reactivated before the car is allowed to move.

- .2 Brakes shall apply when cab leave floor with doors open.
- .2 The auxiliary emergency brake system must be independent of normal braking devices, except for the dual brakes that can bear the rated load.
- .3 Provide a hydraulic device mounted on the ropes within the machine room or a built-in mechanical devices at the machine.
- .4 Supply and install on the speed governor a switch to activate the emergency brake.
- .5 The auxiliary emergency brake system must be installed in a location easily accessible for maintenance and be fixed.
- .6 Perform all test required by code and submit a list of the results to the *Departmental Representative*

2.6 MACHINE GUARDING

- .1 Design criteria:
 - .1 Design the guards according to the following rules of safety and functionality.
 - .2 Design the guards in a modular way allowing a simple and quick installation in different contexts of dimensions and spacing.
 - .3 Cage type guards are not acceptable.
 - .4 Ensure that the clearances between the guard and machine elements or other elevator or structural components allow easy and safe access for maintenance.
 - .5 The guard must be able to withstand at any point of its length, without flexing by more than 5 mm or permanent deformation, a force of 225 N (50 lbf) applied laterally to the element.
- .2 Supply and install machine guarding on the machine (traction sheaves / moving parts / moving cables) in conformance with CNESST requirements
- .3 Supply and install machine guarding on the auxiliary emergency brake in conformance with CSA requirements.
- .4 Supply and install machine guarding on any other moving parts in the machine room in conformance with CNESST requirements to protect workers against accidental contact.
- .5 The guards must meet or exceed the requirements of the CNESST and those identified in the B44.
- .6 Machine guarding must be designed and include wire mesh sections for proper ventilation to avoid overheating of equipment
- .7 Machine guarding should include easy opening access (door, removable portion or other) to allow preventative maintenance and testing of the elevator components.
- .8 The machine access must be opened and closed without using a tool (use easy operation fixation: butterfly screws, clamps or other spring devices).
- .9 Machine guarding should conform to the regulations:
 - .1 Act respecting occupational health and safety (AOHS)
 - .2 Regulation respecting occupational health and safety (ROHS)
 - .3 C21 Act on the criminal liability of organizations,

- .4 CSA Standard Z432-04 - Safeguarding of Machinery.

2.7 MACHINE ROOM INSPECTION UNIT

- .1 Supply and install near to each machine a yellow portable inspection unit for the operation in inspection speed with constant pressure control. Provide the following buttons
 - .1 Up (pressure maintained)
 - .2 In circuit (pressure maintained)
 - .3 Down (pressure maintained)
 - .4 Inspection (2-position selector - NORMAL / INSPECTION)
 - .5 Emergency stop (mushroom type)
- .2 Provide a sufficient length of mobile wiring cable to access all machine parts.
- .3 Provide a fixed location, easily accessible, on one of the walls to store the portable device and wind up the mobile wiring.
- .4 Provide the connection of the portable device to the controller.
- .5 The "Inspection" selector must be designed to prevent any accidental transfer from the "INSPECTION" position to the "NORMAL" position.
- .6 Make the inspection device inoperative if the controls for the inspection on the roof of the cabin or in the cabin or access to the shaft are activated, or if the bypass switch on the door or landing door the cabin is in the "BYPASS" position.
- .7 To make the inspection device operational, the "Inspection" switch located in the controller must be in the "INSPECTION" position.
- .8 With the device operating, the device's "Up and Down" commands must only come into play if the "Inspection" selector of the device is in the "INSPECTION" position and the "On" button is activated.
- .9 With the device operating, the safety circuit supplying the contactors must be open when the device selector is in the "INSPECTION" position and the "On" button is not activated.
- .10 Place a label on the back of the inspection device and the controller displaying the operating instructions. Example: "To use the inspection device of the driving machine, first set the" Inspection "switch located in the controller to the" INSPECTION "position.

2.8 HOIST ROPES

- .1 Replace existing hoist ropes with new steel hoist ropes as per new machine manufacturer specifications.
- .2 Select ropes based on the following criteria:
 - .1 The smallest possible degree of rope wear (thick wires, high wire tensile strength);
 - .2 A long rope life when running over sheaves (thin wires);
 - .3 Compatibility with the sheave (low wire tensile strength);
 - .4 The highest possible breaking strength (fewer or thinner ropes, high wire tensile strength);
 - .5 Low rope elongation due to rope shortening processes and ride comfort expectations (high metallic cross-section and top-quality fibre core).

- .3 Ensure that the load is equally divided on each rope. Retain existing shackles when conforming to Code.
- .4 Ensure that hoist ropes come from the same manufacturing batch.

2.9 TRANSFORMER

- .1 Supply and install a dry type transformer, copper windings, sprinkler proof box, conforming to CSA C22.2 No. 47, C9 and C802.2.
- .2 Seat the transformer of anti-vibration pads.
- .3 Provide the type factor $K = 13$ (as a minimum and according to the harmonic content of its equipment); The K factor of the transformer is determined according to the specifications of ANSI / IEEE C57.110 and its revisions.
- .4 Provide, in addition to technical sheets, calculation details of the transformer choice.
- .5 Three-phase dry-type transformers for non-linear loads will have the following characteristics:
 - .1 ANN type.
 - .2 Sprinkler proof enclosure.
 - .3 Class H (220) insulation with a winding temperature rises not exceeding 150°C .
 - .4 Dielectric insulation capable of withstanding a voltage of 1.2 kV.
 - .5 Impulse withstand voltage: 10 kV B.I.L.
 - .6 Equipped with four 2.5% sockets, including two FCAN and two FCBN.
 - .7 Ventilated enclosure type NEMA-2 (drip proof) or as indicated, equipped with lifting eyes and removable metal panels on the front and on the sides.
 - .8 Permanently identified primary and secondary voltage terminal strips with solderless connectors.
 - .9 Impedance varying from 3 to 5%.
 - .10 Neutral terminal (X0) on the secondary calibrated at twice the nominal phase current for connection to two neutral conductors in parallel.
 - .11 Finishing painting: Gray baked enamel ASA # 61.
 - .12 The grounding bar of the transformer must connect the box and the neutral (X0) of the transformer. Install four terminals for the cables, each with a capacity of 1.25 times the rated secondary current.
- .6 The transformer will be equipped with a primary winding connected in the delta in order to capture the currents of the triple harmonics (3, 9, 15, 21, 27, 33, 39, 45) generated by the load so that the ci is not transmitted to the primary power supply.
- .7 The design of the transformer must allow it to withstand the effects of non-linear loads.
- .8 The transformer will have a winding connected in a star to the secondary.
- .9 The transformer must withstand the following maximum operating conditions without overheating and without loss of life expectancy: 100% of the nominal load in kVA. Crest factors: 3.0.
- .10 One or more electrostatic screens between the windings attenuate the noise transmitted in "common" mode (line earth and neutral earth) and noise in "normal" mode (line line and line-neutral) at the transformer secondary.

- .11 Electrostatic screens must be connected to the transformer grounding bar and must allow the following attenuations:

- .1 Noise in "common" mode: -60 dB approximately.
- .2 Noise in "normal" mode: -20 dB per decade approximately.

2.10 DRIVE SYSTEMS - VVVF

- .1 Supply and install a variable voltage variable frequency system drive.
- .2 In series with the ac-motor, provide modular electronic inverters adequate for this type of installation, which includes a power control feedback.
- .3 Provide modular electronic inverters to vary the frequency and voltage controlled by an algorithm to optimize the system's performance.
- .4 Incorporate in these modular inverters devices to limit electrical noise to 5% of the nominal value.
- .5 The drive system must use a dual phase rectifier and a battery of capacitors to provide dc current to the electronic converter. The electronic converter must use a power Semiconductor and a utilization factor of frequency modulation fundamental not less than one kilohertz to synthesize output 3-phase variable voltage, variable frequency to operate the traction motor in an essentially synchronous mode.
- .6 The drive must be designed with high efficiency capable of providing sufficient voltage to accelerate the elevator to the nominal speed with the rated load. The drive must perform a speed regulation.
- .7 Provide a drive capable of providing an adjustable DC current to the motor for an adjustable time (0 to 1 second) in order to provide a braking pulse to use in the stopping sequence.
- .8 The drive must be able to adjust the curve or program voltage / frequency to match with the characteristics of the traction motor.
- .9 The controller must have a digital speed device adjustment.
- .10 The controller must have a stopping device when the command signal exceeds 5% of the nominal value.
- .11 The controller must provide acceleration and deceleration without bumps and a smooth operation at all speeds.
- .12 Provide filters to dissipate the produced heat.
- .13 Provide filters to limit audible noises to 70 decibels.
- .14 Mount all drive components on anti-vibration pads.
- .15 Supply and install EMIRFI filters type limiting harmonic current and voltage at the entrance of the power line in machine room.
- .16 The maximum total harmonic distortion when the elevator is in motion shall not exceed 10.0%, the measurement being made between phases or phase and neutral. The simple harmonic distortion maximum should not exceed 5%.

- .17 The maximum total harmonic distortion when the elevator is in motion shall not exceed 27.0%, the measurement being made between phases or phase and neutral. The simple harmonic distortion maximum should not exceed 22%
- .18 Provide a safety circuit to stop the elevator when the drive temperature exceeds 20% of the nominal operating value.
- .19 Provide circuits for departures on reduce current and limit in all cases the current basis for a maximum of 300% of normal operating current.
- .20 Provide circuits to limit the current supplied by the drive.
- .21 Paint all the non-machined metal surfaces.

2.11 CONTROLLER CABINET

- .1 House the controller in a metal cabinet with hinged doors.
- .2 Controller cabinet shall be NEMA Type 1.
- .3 Provide in the controller cabinet, two fans to ensure proper ventilation of the cabinet.
- .4 Provide the controller cabinet, lighting compact fluorescent type and an electrical outlet service unit.
- .5 Coordinate cabinet size according to available space.
- .6 Provide dimensions and layout of control devices at the beginning of the project for approval.

2.12 CONTROLLER

- .1 Remove existing equipment.
- .2 Supply and install a controller compatible with the variable frequency and voltage type drive system (VVVF drive)..
- .3 The controller must be of the generic type.
- .4 Provide non-proprietary versions of all controller material including:
 - .1 The Contractor must submit with the deposit his bid, a letter certifying that the proposed material is entirely non-exclusive. All the diagnostic means required are "integrated";
 - .3 All programming and diagrams required for long-term maintenance must be supplied with the controller;
 - .4 Provide a written guarantee that software and firmware updates will be provided at no additional cost to the *Departmental Representative*, for the entire useful life of the equipment.
 - .5 The controller must not stop or change its functionality in any way after a predetermined increment of time or use;
 - .6 Any elevator contractor must be authorized to purchase parts, supplies, schematics, and support or training services directly from the factory at the same cost as the original installer. A published price list must be provided with the controller;

- .7 Parts, including circuit boards, should be able to be purchased directly from the factory in quantity and not just on a "one-for-one" basis.
- .5 Ensure redundancy of safety systems and power circuits as required by ASTM A17.1-2010/CSA B44-2010 Code.
- .6 Upon detection of a system failure or malfunction, the elevator will be stopped at the nearest floor and open its doors until a reset is done by a technician.
- .7 Provide a system that can normally operate in an ambient temperature range of 3°C to 40°C.
- .8 Insulate external signals, such as the hall and car calls, using optical devices. Do not use electromechanical relays for these circuits.
- .9 Provide a digital position indicator in the controller.
- .10 Provide a protection device against phase reversal and phase loss.
- .11 Provide a separate power supply for each printed circuit board.
- .12 Provide a ground connected in parallel to the building ground for each printed circuit board.
- .13 Do not install electronic boards near heat dissipating resistance.
- .14 Electromechanical relays used shall have a minimal lifespan of 25 years.
- .15 Make all connections to properly permanently identified terminals.
- .16 Properly identify relays, contactors, fuses and other components.
- .17 Provide an error-recording device with a capacity of 30 days reading.
- .18 Provide a digital clock with multiple programmable alarms.
- .19 Provide, permanently in the controller, all necessary tools (communication port for access) to view programming, fault identification and history.
- .20 Provide with the maintenance manuals, USB keys (or CD-ROM) containing the controller programming (reboot disk) and all related software.
- .21 Identify the applicable elevator code inside the cabinet.
- .22 Identify the controller using a number on the outside of the door.

2.13 CONTROLLER – INSPECTION AND TEST PANEL

- .1 Supply and install an inspection and test panel as required by ASTM A17.1-2010/CSA B44-2010 Code including among others the following items:
 - .1 Stop switch.
 - .2 Visualization panel as required in the article 2.7.6.4.1 of the ASTM A17.1-2010/CSA B44-2010 code providing the following information: position, direction of travel, operating status (stop/run), door status (open/closed), door unlocking zone, speed and operating mode (automatic / independent / recall).

- .3 Auxiliary power source (4 hours autonomy) for the visualization panel. Provide a monitoring system, if batteries are used, preventing the car from being restarted after a normal stop at a level.
- .4 «CAR DOOR BYPASS» and «HOISTWAY DOOR BYPASS» switches.
- .5 Devices for the manual reset of the detection means for ascending car overspeed protection and protection against unintended car movement
- .2 House the device in the controller cabinet

2.14 CONTROLLER - ACCESS CONTROL

- .1 Access control by the card reader in the car:
 - .1 Design the controller to connect with card readers access control system in the car.
 - .2 Provide terminals and connections in the controller to connect with existing access control system.
 - .3 Provide a location and connection interfaces in the car operating panel for a card reader access control system.
 - .4 Provide all the connection for the car reader access control system between interfaces supply by others and the controller.
 - .5 Provide access control operation in the elevator controller.
 - .1 The access control system will restrict car calls.

2.15 PROTECTION AGAINST ELECTROMAGNETIC FIELDS

- .1 Provide adequate immunity of electronic components against interference and influences due to the surrounding electromagnetic fields to eliminate any source of interference. The equipment shall comply with the standard EN12016 Part 2.

2.16 NOISE CONTROL

- .1 All rollers and guides shall be designed and adjusted for silent operation.
- .2 The door operation mechanisms shall incorporate resilient bumper in order to eliminate the impact sound when doors reach the end of their opening and closing movement.
- .3 Provide two flexible type connections to prevent contact between sections of metal pipes.

2.17 POSITION TRANSDUCER

- .1 Remove existing equipment.
- .2 Supply and install an electronic device to transmit position of the elevator cab to the controller.
- .3 Provide and install on the cabin roof a reader to count the number of perforations in the tape or the location of magnets.
- .4 Provide and install non-metallic trim guide slides on the cab roof to keep the tape facing the reader.
- .5 Ensure automatic levelling of the car at reduced speed in both up and down directions.

- .6 A levelling device with automatic correction in both directions must allow the car to remain level with the floor as long as the car is in the levelling zone.
- .7 Ensure a minimum accuracy of at least 5 mm at any position in the hoistway.
- .8 Ensure at least a reference reading at all levels.
- .9 Strobe devices are acceptable to the extent that the position of the car is controlled at all 5 mm.
- .10 Do not use electromechanical switches.

2.18 ELECTRIC WIRING - GENERAL

- .1 Remove existing equipment
- .2 Supply and install all the wiring to interconnect the elevator components.
- .3 Supply insulated multi-stranded ETT-type wiring having a 60°C flame-retardant and moisture-resisting outer cover.
- .4 Supply and install metal conduits (EMT) ducts or flexible conduits as needed to install all the wiring inside the machine rooms, hoistway or other spaces reserved for the installation of elevator equipment.
- .5 Supply and install wire protection when wiring comes into contact with a sharp surface that can damage the wire protective envelope.
- .6 Provide (15%) additional spare conductors, as a minimum in each cable.
- .7 Provide colour or number-coded conductors in multi-conductor cables.
- .8 Terminate cables on terminal blocks having identifying numbers.
- .9 Make no splices.
- .10 Spare wiring shall be properly identified, insulated and terminated on terminal blocks
- .11 All wiring must be CSA rated.
- .12 Ensure adequate protection of the travelling cable to avoid any contact against hoistway walls and structure.
- .13 Ensure that all circuits are properly grounded.
- .14 Install anti-shorts at wiring entry points within main control and junction box.
- .15 Supply, install and identify junction box for the communication systems, cameras, card readers and others.

2.19 ELECTRIC WIRING – TRAVELLING CABLE

- .1 Remove existing equipment
- .2 Supply and install travelling cable between the car and controller.

- .3 Supply and install travelling cable between the car and controller with the required wires needed by the elevator plus the following connectors: 6 shielded pairs 18 AWG, 3 twisted & shielded pairs for communication, 18 shielded pairs 20 AWG for the card reader, 1 coax cable (with RGU6 connector) at the centre of the travelling cable for a camera, 2 shield pairs 20 AWG for camera and 15% spares of each cable type.

2.20 HOISTWAY SWITCHES

- .1 Remove existing equipment.
- .2 Supply and install hoistway switches for a reliable and smooth operation without significant noise.
- .3 Dolly the switches following the proper adjustments.
- .4 Supply and install stop switches (mushroom type) in the pit connected in series. Install the first stop switches near the ladder at 450 mm above the floor level and a second stop switch near the ladder at 1200 mm above the pit floor if the pit is deeper than 1700 mm.

2.21 BUFFERS

- .1 Remove existing equipment.
- .2 Supply and install spring buffers in accordance with the requirements of the ASTM A17.1-2010/CSA B44-2010 code for the cab and the counterweight.
- .3 Supply and install a new steel base for the buffers.
- .4 Clean, brush and paint with a black epoxy paint all the non-machined metal surfaces.
- .5 Perform all tests required by codes and present the result list to the *Departmental Representative*.

2.22 PIT

- .1 Thoroughly clean and scrub the pit floor
- .2 Paint the pit floor with light gray water-based polyurethane (odourless) paint.
- .3 Paint all pit equipment black on a minimum height of 914 mm with water-based polyurethane (odourless) paint.
- .4 Paint the refuge area (600 mm x 1220 mm) with black and yellow line on the pit floor.
- .5 In any area in the pit, outside the refuge space, where the vertical clearance is less than 600 mm shall be clearly marked on the pit floor as specified by section 2.4.1.6 of ASTM A17.1-2010/CSA B44-2010 code.

2.23 HOISTWAY

- .1 Chamfer any surfaces which project more than 100 mm inside the hoistway with steel sheets to obtain a bevel of 75 deg with respect to the horizontal, as required by ASTM A17.1-2010/CSA B44-2010 code.

2.24 GUIDE RAILS

- .1 Retain existing equipment.
- .2 Check and correct the tightness of all rail anchors and bolts of all rail joints.
- .3 Clean and brush the machined guide rail surfaces to ensure adequate rolling surface without irregularity and paint in black all non-machined surfaces.
- .4 Clean rails along the entire height of the hoistway to eliminate any presence of oil.

2.25 RIDE QUALITY

- .1 The variation between the car guide rails should not exceed ± 1 mm on a vertical distance of 30 m.
- .2 Clean and brush the machined surfaces of the rails to ensure a smooth ride.
- .3 Check the rail joints and polish all horizontal deflections.

2.26 GUIDES: CAR & COUNTERWEIGHTS

- .1 Remove existing equipment.
- .2 Supply and install simple roller guides with a minimum diameter of 150 mm equipped with stop notches installed in the lower and upper parts of the car frame.
- .3 Supply and install single roller guides with a minimum diameter of 75 mm equipped with stop notches installed in the lower and upper parts of the counterweights frame.
- .4 Supply roller guides equipped with durable neoprene roller wheel.
- .5 Supply roller guides with a tension device on three faces ensuring wheels contact at all times on each side of the rail.
- .6 Adjust the roller guides to maintain a slight tension in the guide rails.
- .7 Use a soft material that will not sag after remaining idle for a period of 24 hours under normal operation conditions.

2.27 FASCIAS PLATES

- .1 Retain existing equipment.
- .2 Clean, brush and paint, with a black water-based polyurethane paint (odourless), the fascia plates
- .3 Properly identify with large markings each floor on fascia plates.

2.28 COUNTERWEIGHTS

- .1 Retain existing equipment.
- .2 Check the existing balance before starting work and transmit the information.
 - .1 Measure the existing mass of the car and the counterweight.

- .2 Also provide the information available on the cabin nameplate (cabin mass) as well as the dimensions of the counterweight for evaluation of its mass.
- .3 Check and calibrate the counterweight at the car dead weight plus 40 to 42% of capacity.
- .4 Add any additional mass necessary after the installation of new cab finishes.
- .5 Ensure the counterweight is balanced by the static position.
- .6 Provide temporary spacer blocks under the counterweight to offset the elongation of the ropes.
- .7 Provide and install a new up-to-date nameplate on the cabin roof following the work. Keep the old nameplate.
- .8 Indicate the clearance on the counterweight protector in the pit.
- .9 Paint the counterweight with an acrylic yellow colour.

2.29 CAR PLATFORM AND FRAME

- .1 Retain existing equipment.
- .2 Supply and install a new sub floor made of two (2) plywood sheets (marine grade) 19 mm thick, fully fireproofed, secured in place (glued & screwed every 150 mm) using mechanical flush fasteners.
- .3 Balance the car near the static position.
- .4 Not used .
- .5 Paint all non-machined metal surfaces.
- .6 Clean, brush and paint, with a black water-based polyurethane paint (odourless), all equipment.

2.30 PLATFORM GUARDS - TOE GUARD

- .1 Supply and install a platform guard (toe guard) with a straight vertical face extending below the floor surface of the platform for a minimum of 1220 mm as required by section 2.15.9 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Paint the plate in yellow.

2.31 SAFETIES - CAR

- .1 Remove existing equipment.
- .2 Supply and install car safeties rated for the equipment load and speed.
- .3 Ensure that all components of the safeties are rust-free and well lubricated.
- .4 Perform all the tests required by codes and authorities and submit a report to the *Departmental Representative*.

2.32 GOVERNORS – CAR

- .1 Remove existing equipment.
- .2 Supply and install an automatic reset overspeed governor to operate the parachutes according to code requirements.
- .3 Choose a governor suitable for the dimensions of the machine room.
- .4 Supply and install an electric switch on the overspeed governor to cut the motor power before the safeties are activated.
- .5 Supply and install a new tension sheave in the pit.
- .6 Supply and install a new cable for the governor.
- .7 Ensure that all components of the overspeed devices are rust-free and well lubricated.
- .8 Perform all the tests required by codes and authorities and submit a report to the *Departmental Representative*.

2.33 INSPECTION UNIT

- .1 Supply and install an inspection unit on the car top of the operation in inspection speed with constant pressure control.
- .2 Supply and install a LED protected light bar equivalent to 15 W minimum (equivalent of 100 Watts incandescent). The illuminance level measured at the farthest point to be inspected will be at least 100 lx.
- .3 The device shall be permanently located on top of the car and readily accessible from the landing to the maintenance technician.

2.34 CAB

- .1 Remove existing cab finishes.
- .2 Remove existing metallic cab shell and 2 438 mm high.
- .3 Supply and install a 16 gauge, 2 438 mm high metal cab.
 - .1 Ensure solid construction of the cab shell using external profiles in sufficient numbers.
 - .2 Interior walls: panels made of sheet steel, attached to the car frame and platform.
- .4 Supply and install a roof made of reinforced steel sheet to support the weight of the equipment and the two mechanics.
- .5 Supply and install a metal guard rails at all edges (on the 2 sides without door) of the roof as required ASTM A17.1-2010/CSA B44-2010 code. Position the guard to optimize space on the roof of the cab.
- .6 The cab shall meet ASTM A17.1-2010/CSA B44-2010 code requirements.
- .7 Wall:

- .1 Cover side and rear wall sections of cab enclosure with 304 stainless steel, 20 gauge, # 4 finish and 5WL pattern. Provide full height sections with a maximum of 600 mm wide.
- .2 Cover the front wall with stainless steel 20ga, no4 finish. Polishing shall be vertical.
- .3 Provide the necessary ventilation opening.
- .4 Supply and install one set of protective cushions per cabin to cover vertical cabin surfaces as well as stainless steel fasteners on all cab walls.
- .8 Handrails:
 - .1 Supply and install solid round 304 stainless steel handrails 38 mm of diameter rounded at ends on cabin walls.
 - .2 Provide enough fasteners to ensure a solid construction.
 - .3 Ensure a minimum clearance of 51 mm between the handrail and the finish.
- .9 Bumpers:
 - .1 Provide and install bumpers as shown on the plans.
 - .2 Secure bumpers to the platform. Make sure it is secured in at least three solid places at the bottom of the cab.
 - .3 The end of the bumpers, on the side of the door, must be bent at +/- 30 degrees to an appropriate length in order to avoid a blow.
- .10 Ceiling:
 - .1 Ceiling painted with a baked enamel paint (industrial quality) in white color or at the choice of the *Ministerial Representative*.
 - .2 Supply and install two (2) LED type luminaires in 1220mm lengths of industrial quality recessed in the cabin ceiling and covered with a protective screen with protective box on the roof. Maintenance and replacement of lighting system components should be performed from inside the cabin without the assistance of an elevator mechanic.. The lighting system must be sufficient to provide a consistent light intensity of 215 lx, measured at 0.75 m above the floor
 - .3 Include an emergency exit from the ceiling. .
 - .4 Ensure that no anchor or fastener exceeds the car roof.
 - .5 Supply and install a two-speed electric air exhaust fan, with a capacity of 200 litres per seconds and producing no more than 55 dBA at low speed. Provide a dimmer located on the cab roof to modulate high speed.
- .11 Floor:
 - .1 Supply and install a 6 mm thick non-slip grid stainless steel (type 304) floor finish with a mat finish (# 2B), fixed in place by mechanical fasteners. Seal the joints.
- .12 Door:
 - .1 Supply and install a stainless steel 24 ga, no4 finish car door. Polishing shall be vertical.
 - .2 Supply and install an extruded nickel silver cab door sills with wearing non-slip surface.
 - .3 Supply and install door nylon gib.
 - .4 Supply and install all equipment required for a durable and efficient system operation.

2.35 CAR DOOR EQUIPMENT

- .1 Remove existing equipment.
- .2 Supply and install a heavy-duty type closed-loop variable speed and torque control door operator rated at speed of 910 mm per second.
- .3 Supply and install a car door clutch.
- .4 Supply and install car interlock.
- .5 Supply and install a door lock to restrict the opening of the car door from the inside when it is outside the unlocking zone as required by article 2.12.5 of ASTM A17.1-2010/CSA B44-2010.
- .6 Supply and install all equipment doors needed for a durable and efficient system operation.
- .7 Supply and install a new suspension rail fitted with rubber bumpers. Rail shall be easy to replace.
- .8 Supply and install two suspension rollers per door panel with a minimum diameter of 75 mm.
- .9 The suspension rollers shall be made of material designed to retain lubricant and be equipped with cleaning felt.
- .10 Provide on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.

2.36 HALL DOOR EQUIPMENT

- .1 Remove existing hall door equipment (hanger track / hanger sheaves / pickup rollers / interlock / door closer).
- .2 Supply and install all door equipment needed for a durable and efficient system operation.
- .3 Supply and install new hanger tracks at all levels. The hanger tracks must be fitted with stoppers. The track should be of an easy-to-replace model.
- .4 Securely fix the tracks to the building frame.
- .5 Supply and install two hanger sheaves per door panel with a minimum diameter of 75 mm. The hanger sheaves shall be made of material designed to retain lubricants and be equipped with cleaning felt.
- .6 Supply and install a complete new hall door interlock system (interlock and opening mechanism) at all floors.
- .7 Supply and install a ground connected on all interlocks.
- .8 Supply and install new door spring closer at all floors.
- .9 Remove existing hall door panels and retain hall door frames and do the following work:
 - .1 Remove existing door panels.

- .2 Supply and install new stainless steel no4 finish hall door panels. Polishing shall be vertical.
 - .1
 - .2 Supply and install door astragals;
 - .3 Supply and install lower door guides;
 - .4 Supply and install fire retaining metal guides at the lower and upper part of the doors.
 - .5 Supply and install on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.
- .3 Retain hall door frames
 - .1 Clean and polish the frames by a polishing specialist all the landing door frames to give a new appearance.
- .10 Correctly align the hall door panels.
- .11 Provide on the structural upright of the landing entrance, an adjustable rubber stopper to limit the travel of the door beyond the normal opening.
- .12 Clean the existing sills.
- .13 Provide on the edge of the door panels, a rubber bumper to eliminate the slap at the time of closing.

2.37 HOISTWAY DOOR UNLOCKING DEVICES

- .1 Supply and install a hoistway door unlocking devices at all floors as required by section 2.12.6 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Supply and install aluminum trim rings at all levels.

2.38 HOISTWAY ACCESS SWITCHES

- .1 Supply and install a hoistway access switches at the bottom & top floor as required by section 2.12.7 of ASTM A17.1-2010/CSA B44-2010 code.
- .2 Integrate this switch in the door frame or in the hall station unit.
- .3 Plan to close the opening of the old device with a 12 gauge stainless steel plate, if applicable.

2.39 HALL CALLS STATIONS

- .1 Remove existing equipment.
- .2 Supply and install surface mount fixtures on a low-profile enclosure (max 25 mm) elongated on the surface with rounded edges of robust anti-vandalism type (stainless steel / stainless steel) with compact contact module (illuminated in red) type LED, luminous at its perimeter at each landing.
 - .1 Each button will become a high intensity when the button is pressed (one intensity model).
- .3 Provide on the main floor call station the following items:
 - .1 Visual fire hat signal <hidden legend>, LED type, for Phase I Emergency Recall Operation;

- .2 A three-position key-operated switch (group 3) labelled "FIRE RECALL" and its positions marked "RESET – OFF – ON" (in that order). The letters shall be a minimum of 5 mm high in red.
- .3 Visual signal for Emergency Power Operation <hidden legend>, LED type, to indicate that the lift is supplied with the emergency power supply.
- .4 Provide a hoistway access switch as required by code. Insert the switch in the hall stations or door frames.
- .5 The LED lights used in call stations shall have a useful life of at least 100 000 hours.
- .6 Provide all plates in stainless steel 304 no4 finish.
- .7 Engrave all required markings, in French & English language, directly on the plates, as per ASTM A17.1-2010/CSA B44-2010 code.
- .8 Provide fireproof and / or acoustic seals around the various electrical conduits.

2.40 HALL POSITION INDICATOR

- .1 Supply and install a digital position indicator at all floors. Characters shall be 50 mm high.
- .2 Install position indicator in hall stations.
- .3 Provide a # 4 stainless steel cover plate on low-profile enclosures (max 25 mm) with rounded edges.

2.41 HALL DIRECTION LANTERN

- .1 Supply and install a direction lantern, raised arrow type, with electronic gong at each car door jamb.
- .2 When the car is within a certain distance of a floor where it should stop, the direction lantern must illuminate with tone sounds to indicate the direction of the car.
- .3 The lantern must remain illuminated until the car leaves the floor.
- .4 In Up direction, the tone must ring once, and in Down direction, the tone must ring twice.
- .5 Include an adjustable gong tone device.
- .6 Provide No. 4 finished stainless steel plates.

2.42 CAR OPERATING PANEL - MAIN

- .1 Supply and install one (1) car operating panel, mounted on invisible hinge, in stainless steel finish No. 4 integrated in the car front return as per the requirements of ASTM A17.1-2010/CSA B44-2010 code and the following requirements:
 - .1 Illuminated heavy-duty vandal-proof pushbuttons (steel/steel) , with compact contact modules, red LED illuminated push button with integrated Braille tag corresponding to floors served.
 - .2 Each button will become a high intensity when the button is pressed (one intensity model).
 - .3 Door open button labelled "OPEN" and door closer button labelled "CLOSE".
 - .4 Alarm button, with a raised ring with integrated Braille tag,

- .5 Emergency button, with a raised ring, with a phone symbol labelled "PUSH TO CALL" above and "HELP" below button. The button light will remain permanently on a low intensity (white) and become a high intensity (red) when the button is pressed (model with two colours (white / red) and two intensities).
- .6 Visual indication located in the upper part of the car operation panel to acknowledge that two-way communications link has been established labelled, "COMMUNICATION ESTABLISHED".
- .7 Visual fire hat signal for Phase I Emergency Recall Operation;
- .8 Visual signal for Emergency Power Operation <hidden legend>, LED type, to indicate that the lift is supplied with the emergency power supply.
- .9 A red LED light <hidden legend> indicating the activation of the independent service operation marked independent service.
- .2 Supply and install a firefighters' operation cabinet (as per section 2.27.3.3.7 of ASTM A17.1-2010/CSA B44-2010 code), at the top of the car operating panel, with the following items:
 - .1 A three-position key-operated switch (group 3) labelled "FIRE OPERATION" and its positions marked "OFF – HOLD – ON" (in that order). The letters shall be a minimum of 5 mm high in red. It shall become effective only when Phase I Emergency Recall Operation is in effect and the car has been returned to the recall level.
 - .2 A button labelled "CALL CANCEL" which shall be effective during Phase II Emergency In-Car Operation. When activated, all registered calls shall be cancelled and a travelling car shall stop at or before the next available landing.
 - .3 Door open and close buttons;
 - .4 A "RUN" / "STOP" switch
 - .5 Visual signal for Phase I Emergency Recall Operation;
 - .6 A descriptive plate with marking shown in figure 2.27.7.2 of ASTM A17.1-2010/CSA B44-2010 code.
 - .7 The cabinet door access key must be the same as phase II switch.
 - .8 The cabinet door must lock automatically when the door is closed.
- .3 Supply and install a service cabinet at the bottom of the car operating panel, locked by a key switch with the following items:
 - .1 Stop key switch with marling <STOP / RUN>
 - .2 Independent service key switch;
 - .3 Light switch;
 - .4 Emergency light test switch;
 - .5 Fan key switch;
 - .6 Hoistway access key switch.
- .4 The LED lights used in car operation panel shall have a useful life of at least 100 000 hours.
- .5 Engrave all required markings directly on the plates.
- .6 Provide all plates in stainless steel no4 finish.
- .7 Supply and install a digital position indicator on the car operating panel. Characters shall be 50 mm high. The unit must have direction arrows.

2.43 CAR INTERCOMMUNICATION SYSTEM

- .1 Supply and install a hands-free phone in each elevator to establish two-way communication between the car and a location in the building and in accordance with section 2.27.1.1 of CAN/CSA-B44-10 code. This place shall be readily accessible to authorize and emergency personnel. The phone must include the following items:
 - .1 An emergency push button labelled "HELP".
 - .2 A visual indication on the same panel as the "HELP" push button to acknowledge that two-way communications link has been established.
- .2 Supply and install wiring to connect the car phone system to the controller in the machine room.
- .3 The devices shall be easily remote programmable. Access to the program shall be protected by a code.
- .4 The phone will automatically dial the programmed number when the "HELP" push button is pressed. If that number is busy, a second number can be programmed.
- .5 The communication should be clear and without parasites anywhere in the cab and can also be initiated from an external telephone.
- .6 Ensure that all circuits are properly grounded.
- .7 Provide the location and holes in the car operating panel.

2.44 VOICE SYNTHESIZER

- .1 Supply and install a voice synthesizer in each car.
- .2 The system will announce the floor of arrival before opening the doors.
- .3 The system must be able to store 40 customized messages (8 seconds each) for a total or 5 minutes of capacity.
- .4 The speaker system shall be at least 0.5 Watts and 8 Ohm type.
- .5 The microphone for recording messages must be 1 K Ohm type with minimum sensitivity of 64 dB.
- .6 The device must be easily programmable. The memory access must be coded protected.
- .7 Install the system so that the message is clear and noise free anywhere in the cab.
- .8 Submit a list of proposed messages for approval to the *Departmental Representative*.

2.45 CAR EMERGENCY LIGHT

- .1 Supply and install an emergency lighting unit, in the car operating panel, with autonomy of 4 hours, designed for this application.
- .2 The unit will produce an instant lighting when normal power is lost.
- .3 The emergency lighting unit must provide a general brightness of 22 lux in the cab at a distance of 1200 mm.

- .4 Supply and install a sealed rechargeable battery and powered by the normal current.

2.46 DOOR PROTECTION DEVICE

- .1 Supply and install a multibeam infrared door protection device.
- .2 The detection field shall start at a maximum of 150 mm from the floor and extend up to a maximum of 300 mm from the top of the entrance.
- .3 The system must remain operational until a failure of 10% of the infrared rays. A light shall indicate the device failure. In case of failure, deactivate the nudging except for emergency recall.
- .4 The door shall reopen completely when the door protection devices are activated.
- .5 Arrange that when the door protective devices are activated for more than 20 seconds continuously, a nudging buzzer signal is activated

2.47 ENGRAVING

- .1 Identify the elevator at the main floor with a number 75 mm in height. This number should be engraved on a stainless steel plate.
- .2 Identify the elevator with engraving on the car operating station.
- .3 Identify all equipment parts located in machine room as well as the car frame and counterweight screen.
- .4 Identify the refuge areas on the car top.
- .5 Supply and install Arabic numerals and Braille markings designating levels on the two doorframes hall entrance. The bottom of the numbers shall be at 1525 mm from the floor. At the main floor, a star shall be supplied in addition to the identification requested.
- .6 Provide all other inscriptions required by authorities.
- .7 All engraving shall be in French & English language.
- .8 All inscriptions should be engraved to a minimum depth of 0.25 mm on the metal surfaces of the fixtures.

2.48 KEYS

- .1 Provide a minimum of 6 sets of keys clearly identified for the operation of the emergency recall and special emergency service key switches.
- .2 The various switches and keys shall meet the requirements of the Elevator Code.
- .3 Any item referring to locks / keys " FIRE OPERATION " for "fire recall" phase I and II: These locks / keys group 3 must be provided by the contractor and will be of the universal model recognized as the "FEO-K1" .

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with the manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Install hoistway, machine room, and other elevator materials and components in accordance with ASTM A17.1-2010/CSA B44-2010, local codes, regulations and manufacturers' written instructions.

3.3 FIELD QUALITY CONTROL

- .1 Verification requirements include:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Recycled content.
 - .6 Local/regional materials.
 - .7 Certified wood.
 - .8 Low-emitting materials.

3.4 SITE TESTS

- .1 Perform and meet tests required by ASTM A17.1-2010/CSA B44-2010.
 - .1 Submit test data forms in accordance with Section 01 91 13 16 - Commissioning Forms before requesting an inspection by the *Departmental Representative*.
 - .2 Perform real time testing of Emergency Operation (Emergency Recall Operation - Phase I & Emergency In-car Operation - Phase II) and emergency power operation with *Departmental Representative*.
- .2 Supply instruments and execute specific tests.
- .3 Furnish test and approval certificates issued by jurisdictional authorities.
- .4 At agreed time during twelve-month warranty period, and with building normally occupied using normal building traffic, conduct tests to verify performance. Furnish event recording of hall call registrations, time initiated, and response time throughout entire normal working day.

3.5 CLEANING

- .1 Remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components ready for inspection.

3.6 ADJUSTMENTS

- .1 Adjust door opening and closing times to suit handicapped users in accordance with *Departmental Representative* instructions.

- .2 Adjust control system to cause elevators to answer hall calls during working days within performance criteria specified.
- .3 Adjust for smooth acceleration and deceleration of the car as so not to cause passenger discomfort.
- .4 Adjust automatic floor levelling features at each floor.

3.7 SCHEDULE OF WORK

- .1 The work shall be coordinated with *Departmental Representative*.

3.8 SEQUENCE OF WORK

- .1 Schedule the modernization sequence in accordance with Section 01 14 00 - Work restrictions.
- .2 Schedule a maximum of 6 weeks per elevator for modernization works.
- .3 The final sequence of work must be submitted before the start of work for approval by *Departmental Representative*.

3.9 DISMANTLEMENT

- .1 Coordinate equipment dismantlement with *Departmental Representative*.
- .2 Machine Room: Dismantle the machine, the control cabinets, wiring, floor selectors, governors and any other replaced or no longer needed equipment.
- .3 Hoistway: Dismantle cab finish, mobile and fixed wiring, hoistway switches, landing door equipment, and any other replaced or no longer needed equipment.
- .4 Following dismantlement, dispose of equipment in accordance with Section 01 74 19.

3.10 INSERTING AND REMOVING EQUIPMENT

- .1 The Contractor is responsible for the insertion and removal of the equipment described in this section.
- .2 The contractor is responsible for providing all equipment necessary for insertion, handling and installation of the equipment in the machine room or in the hoistway.
- .3 Access to the machine room is from the corridors and stairways of the building.
- .4 The Contractor is responsible for verifying the paths and provide equipment to meet the dimensions of access constraints.
- .5 No new opening will be made in the machine room.

3.11 WELDING WORK

- .1 If welding works are required on the site, obtain all necessary approvals by *Departmental Representative* before performing the works.
- .2 All site welds must be made by a qualified welder and identified with his identification mark.

3.12 TOUCH UP WORK

- .1 Ensure that all exposed metal surfaces are painted.
- .2 At the end of the work, retouch and repair all finished surfaces assembled at the factory, where the finish is altered or damaged.
- .3 Repair or replace any damaged item, without charge, before the substantial completion of work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Related sections
 - .1 Section 14 00 00 – Additional General Conditions
 - .2 Section 14 20 06.1 – Elevator 1
 - .3 Section 14 20 06.2 – Elevator 2

1.2 DESCRIPTION

- .1 The *Contractor* agrees to provide skilled labor, adequate equipment supervision, tools, instruments, materials and parts required for a complete elevator maintenance service according to the specifications and the terms and conditions set out in this document.
- .2 The full maintenance service includes periodic preventive inspections, callback and repair service in case of breakdowns including parts and labor for repairs or preventive replacements.
- .3 All work causing a shutdown of a complete elevator group shall be performed outside regular hours with the approval of *Departmental Representative* and without additional fees.
- .4 The requirements of the specifications herein and the specifications from the manufacturer shall be considered only as a minimum to be achieved and shall not limit the responsibility and warranty of the *Contractor*.
- .5 Execute all the works in conformity with the rules of the art and to the safety requirements generally recognized for this type of installation.
- .6 In every case where the singular is used in the specifications, it is implied that the plural applies when necessities to complete adequately the installation.

1.3 DEFINITIONS

- .1 The term *Verify / Examine* implies to clean, lubricate, calibrate, adjust, repair or replace parts as needed.
- .2 The term *Clean* implies to remove any dust, carbon dust, rust, oil, grease, etc located on any equipment, part of equipment or working zone.
- .3 The term 'regular hours' means the time frame from Monday to Friday between 8 am and 17 pm except industry holidays.

1.4 CODES AND REGULATIONS

- .1 Execute all required work in accordance with the latest editions of the ASTM A17.1-2010/CSA B44-2010 Code (update included), CAN/CSA-B651-12 Code and any other federal, provincial and municipal regulations applicable for this type of installation, including the National building Code of Canada and the Quebec Electrical Code.
- .2 Execute all work in compliance with the labor standards applicable for this type of installation.

- .3 Inform *Departmental Representative* of any changes to these requirements occurring during the term of the contract and work to be done to meet them included or not in this contract.

1.5 SPECIFICATIONS INTENTIONS

- .1 The purpose of the specifications is to describe the procedures and requirements of maintenance to ensure proper operation of elevators. The *Contractor* agrees to comply with the specifications.
- .2 Preventive maintenance described in the specifications must be executed to ensure equipment higher life expectancy, in addition to minimize the unplanned operating stops.

1.6 WORK NOT INCLUDED

- .1 For all work not included herein, the *Contractor* shall obtain the written approval of *Departmental Representative* before performing the work.
- .2 Work not included under this contract are defined as follows:
 - .1 Work to be performed outside the hours prescribed and approved in writing by *Departmental Representative*.
 - .2 Work made necessary due to vandalism and approved in writing by *Departmental Representative*.
- .3 *Departmental Representative* reserves the right in the case of emergency repairs, to do the emergency repair work in overtime.
 - .1 Emergency repair:
 - .1 The *Contractor* shall, in all cases of emergency repair, notify the *Departmental Representative* and evaluate opportunities with him to complete the repairs in overtime. The evaluation of the work period required in overtime time will be indicated to *Departmental Representative*.
 - .2 The *Contractor* shall complete the repairs in overtime after obtaining written approval of *Departmental Representative*.
 - .3 Emergency repairs carried out in extra time at the request of *Departmental Representative*, shall be paid as follows: The *Contractor* will absorb the number of hours worked at the regular rate and *Departmental Representative* will only pay an additional amount for premium hours.

1.7 SITE VISIT

- .1 The *Contractor* acknowledges having examined the site before submitting its bid and, therefore, may not claim any errors or omissions on the nature and extent of its commitments and obligations

1.8 OWNERSHIP OF EQUIPMENT

- .1 The *Contractor* shall be responsible for any good belonging to *Departmental Representative*, when these possessions are under the care or control of the *Contractor*. The *Contractor* shall be responsible for any loss or damage resulting from his negligence or that of his employees.

- .2 All existing equipment, including any replacement parts installed under the contract or any other components that extra payment was made for, are the exclusive property of *Departmental Representative*.

1.9 CONTRACTOR'S PERSONNEL

- .1 The *Contractor* shall provide skilled workers with valid elevator mechanic skills cards and confined space skills cards and a minimum of five years experience, able to work with promptness and efficiency in a manner that conforms to rules Art and the *Departmental Representative* satisfactory.
- .2 *Departmental Representative* may require from the *Contractor* to replace any employee he considers incompetent, negligent or otherwise undesirable. A verbal notice is sufficient for the exercise of this right.
- .3 Unless otherwise noted, if the staff of the *Departmental Representative* staff or the building occupant goes on strike, the *Contractor's* employees must continue the work. If the *Contractor's* employees were unable to perform the work, the owner, in its sole discretion, will decide what measures to take.
- .4 The *Contractor* has the responsibility to train its employees, at its expenses, even when training is necessary to meet the specific needs of this contract.
- .5 The *Contractor's* employees assigned to this contract shall wear a uniform with the company's name on it.
- .6 The *Contractor's* employees assigned to this contract shall be able to speak French and English.

1.10 RESPECT OF THE EMPLOYMENT LAWS

- .1 The *Contractor*, as an employer must pay any all subscription according to the Canada Pension Plan, the Industrial Accidents Act, laws concerning taxation, the Unemployment Insurance Act and other mandatory contributions under federal, provincial or municipal law.
- .2 *Departmental Representative* has the right to terminate this contract at any time if the *Contractor* or its subcontractors are not complying with the work health, equity and safety commission.
- .3 *Departmental Representative* may deduct any amount due to the *Contractor* until it or its subcontractors pay fully all contributions above.

1.11 SAFETY MEASURES

- .1 This article states the minimum standard and does not limit in any ways the responsibilities and obligations of the Contractor. In case of conflict between the security measures set out below and the established practices of the *Departmental Representative*, the established practices of the *Departmental Representative* have precedence. The *Departmental Representative* may at its sole discretion, impose additional standards of safety.
- .2 The particular instructions and the orders given by *Departmental Representative* on the workplace also have precedence on any safety measures expressed in the present.
- .1 Smoking is prohibited in the building.

- .2 The *Contractor* shall not use the materials, tools and equipment belonging to the *Departmental Representative* without the consent of the latter.
- .3 *Departmental Representative* may, at its discretion and according to his instructions, suspend or terminate the work of the *Contractor* for reasons of security without liability to *Departmental Representative* or any compensation for the Contractor. The instructions and stop work shall be recorded by the *Contractor* and the Departmental Representative, they will agree on the date and method of resumption.
- .4 The *Contractor* shall provide and install quality warning signs and temporary partitions (barricades) with a minimum height of 42 inches for the protection of public areas for work when hindering public traffic areas.
- .5 The *Contractor* shall ensure that its employees are aware of the building fire fighting equipment and safety measures.
- .6 The *Contractor* shall ensure that its employees have at their disposal the equipment and safety clothing required for the execution of their functions.
- .7 The *Contractor* has the responsibility to inform the *Departmental Representative* of any hazardous or unsafe conditions, and in the shortest possible time.
- .3 The *Contractor* is, at all times, responsible for ensuring the safety of its employees and any person and all movable and immovable property near the work and shall at all times comply with all standards, code and law on health and safety.
- .4 The *Contractor* must follow the procedures outlined in the building orientation guide.

1.12 SECURITY MESURES - HOT WORK

- .1 The *Contractor* must follow the procedures outlined in the building orientation guide.

1.13 SECURITY MESURES – CONFINED SPACE

- .1 The *Contractor* must carry out his work in accordance with the instructions established in section 01 35 29.06 Health and safety.
- .2 The *Contractor* is responsible for developing the safe work procedures required according to article 1.32 of section 01 35 29.06 Health and safety. The *Contractor* must write up the procedures and have them approved by the *Departmental Representative*, before the start of maintenance work.
- .3 The *Contractor* shall transmit the risk assessment forms to *Departmental Representative* at least 5 days before the date set for entry into these confined spaces. He should include all costs for the measures to be taken, monitored and strictly enforced in order to meet safety requirements for confined spaces.

1.14 RESPONSIBILITY

- .1 The *Contractor* assumes all the risks and responsibilities which relates to the execution of the present contract including its appendices and has to take all the necessary measures to avoid any damages to *Departmental Representative* or third party goods. For that purpose, the *Contractor* makes a commitment to guarantee and to indemnify *Departmental Representative* against any damages, losses, complaints or expenses resulting from the present contract, including the expenses and judicial and extrajudicial fees engaged by *Departmental Representative* and to take sides for him.

1.15 CESSION

- .1 The present contract is non-transferable by the *Contractor* and cannot be given in subcontracting, in all or in part, without the preliminary written assent of the other sides. The fact for the *Contractor* to give up the present contract or to give it in subcontracting does not relieve him of its obligations at the end of the present contract.
- .2 The *Contractor* declares that he did not sell or given up the universality, a part or a particular category of his current or future debts and he makes a commitment to inform *Departmental Representative* of any sale or possible transfer of his debts within ten (10) days of the aforementioned sale or transfer.
- .3 If the *Contractor* does not inform *Departmental Representative* according to the disposition which precede and in which *Departmental Representative* becomes responsible for the payment to the transferee of sums of money already paid to the Contractor, the *Contractor* and the signatory of the present contract shall be jointly responsible for the repayment to *Departmental Representative* of any sum paid to the Contractor.

1.16 QUALITY INSURANCE

- .1 *Departmental Representative* reserves the right at the end of the present contract to verify or mandate someone to verify the work made during the course of the contract.
- .2 In every case, the *Contractor* recognizes that at the end of the present contract he is responsible for the quality of the works made during the course of the contract.
- .3 The *Contractor* shall maintain and supply on reasonable request the appropriate documentation which demonstrates the respect for the present contract.
- .4 Departmental Representative can, at any time during the term of this contract, inspect or make inspect the works by his consultants, verify the operations of the *Contractor* and have access to areas and necessary documentation for the verification of any subject relative to this contract. The Contractor
- .5 has to foresee the availability of his staff assigned to the contract.
- .6 If *Departmental Representative* deposits a note in regards to the quality of the works or the executed services, the *Contractor* has to, within a few hours, supply to *Departmental Representative* a written report describing the badly executed works and the measures taken to avoid a recurrence.
- .7 The *Contractor* agrees that the requirements of quality insurance of this contract also apply to his subcontractors.
- .8 The *Contractor* has to demonstrate, on request, and to the satisfaction of *Departmental Representative* the following:
 - .1 The existence and the respect of a work quality control program.
 - .2 The applicable manufacturing standards at the equipment installation time;
 - .3 The *Contractor* shall perform periodic verifications of the services supplied to *Departmental Representative*, according to the calendar foreseen by the quality control program aiming at verifying the efficiency of the works. The frequency of the verifications can be straightened according to the results of the previous verifications or be negotiated between sides at needs.

- .9 The *Contractor* shall assist to monthly meetings with *Departmental Representative* to evaluate the maintenance quality as well as to verify with him the breakdowns listing and maintenance registers.

1.17 REPLACEMENT PARTS

- .1 Except approved modification, the replacement parts used on the vertical transport system within the course of this contract shall be authentic parts of current production.
- .2 If the *Contractor* judges that he would have a better replacement part, he shall submit it to *Departmental Representative* for approval. This new piece will be the responsibility (parts and labor) of the Contractor.

1.18 PROCEDURES

- .1 The *Contractor* shall submit to *Departmental Representative* a list of the mechanics and their supervisor that are qualified to perform the maintenance preventive on the equipments. This list shall include their experience, as well as any other relevant information in regard to their work.
- .2 The maintenance preventive shall be performed during regular hours. At his arrival on site, the mechanic shall register with the person in charge of the building.
- .3 Any work causing a shutdown of a complete elevator group shall be performed outside regular hours with the approval of *Departmental Representative* and without additional fees.
- .4 At any given time, *Departmental Representative* shall be informed, at least 5 days in advance, of any major works which would require the shutdown of a unit.
- .5 At any given time, *Departmental Representative* shall be informed, at least 24 hours in advance, of any deliveries which must be made at loading dock.
- .6 No work generating noise of more than 70 dBa or generating strong smells will be tolerated during regular hours. Those works shall be done outside regular hours without any fees to *Departmental Representative*. Only *Departmental Representative* shall be the judge of the tolerated works.
- .7 No demand for overtime work will be accepted without prior written authorization of *Departmental Representative*.

1.19 CLEANLINESS AND DAMAGES

- .1 At any given time, the machine room, hoistway, car top or any other areas directly related to the operation of the elevator shall be clean and free of any obstacle.
- .2 Oil leaks and the abnormal accumulations of dust shall be quickly cleaned and their causes determined for immediate necessary corrections.
- .3 When work must be executed on landing floors, the mechanic shall make sure to protect the floor or any other surfaces not to soil the area. The mechanic shall make sure to leave the area in the same state of cleanliness at the time of his arrival.
- .4 *Departmental Representative* reserves the right to demand to the *Contractor* the costs required to correct the damages or the stains caused by the *Contractor*.

1.20 MAINTENANCE LOGBOOK

- .1 Keep in the machine room a clean and up to date maintenance logbook. This register shall include, for each of the visits, the date and arrival time, the purpose and brief description of work done, the detail of the testing and checking. Always keep the activities of the last five years in the register.
- .2 Include in the maintenance logbook a schedule of the routine works required within the course of the preventive maintenance.
- .3 Submit to *Departmental Representative* a detailed monthly report on the service calls and other work on the equipments. Participate in a meeting, as needed, with *Departmental Representative* to discuss the report and the activities which relates to the maintenance. The monthly report shall include at least the following information:
 - Date;
 - Building / Location;
 - Elevator Number;
 - Time of the call;
 - Time of arrival;
 - Time spent on the call;
 - Description of the problem by the client;
 - Problem Description and Action taken to resolve it by the mechanic;
 - Name of the mechanic.

1.21 ANNUAL TESTS

- .1 Perform all the tests prescribed in Section 8.11.2 and 8.11.3 of ASTM A17.1-2010/CSA B44-2010 code. The annual tests shall be conducted 30 days before the contract expires.
- .2 Provide *Departmental Representative* a copy of the certificates of annuals tests.

Part 2 PREVENTIVE & CORRECTIVE MAINTENANCE

2.1 MAINTENANCE SERVICES

- .1 *Contractor Responsibility*
 - .1 Responsibility of the Contractor, without limitation, applies to the following components:
 - .1 Controller including all the relays, semiconductors, resistances, condensers, transformers, contacts, conductors, control potentiometers, computer components and traveling cable.
 - .2 Selector and dispatch equipment including selector steel tape and the mechanical and electric driving equipment.
 - .3 Hoistway equipments including platform and counterweights, buffers, guide rails, superior and inferior terminal stopping devices.
 - .4 Hall and car fixtures including pushbutton, key-operated switches and direction & position lantern indicator.
 - .5 Hall door equipments including interlocks, door suspension, door guides and door closing devices as well as all the safety open door devices.
 - .6 Car door equipments including door operator, door suspension, door guides, keys, motors, coupling arms, cams and contacts.
 - .7 Platform equipments including the frame, weight detector, safeties, shoe or roller guides.

- .8 Not Used
 - .9 Not Used
 - .10 Not Used
 - .11 Not Used
 - .12 Pumps and hydraulic motor, hydraulic cylinder and plunger if out of ground installation, hydraulic liquids, valves unit, filters, mufflers, cathodic protection system, vitaulic joint and gasketsm, oil cooler and oil heater.
 - .13 Motor and motor generator including motor winding, rotating parts, commutator, brushes, brush holders and bearings.
 - .14 Auxiliary brake system.
 - .15 Cab fan and emergency lighting system.
 - .16 Communication system between cab, machine room and security desk.
 - .17 Not Used
 - .18 Not Used
 - .2 The *Contractor* is not responsible for following components:
 - .1 Hoistway enclosure including doors and hall barriers, door frame and hall door sill;
 - .2 Any damages due to vandalism acknowledged by Departmental Representative.
 - .2 Vandalism
 - .1 Work related to damage caused by acts of vandalism must be recognized by Departmental Representative.
 - .2 Charge in addition to the contract, only the vandalized parts and limited profit margin and administration 15% of the cost of parts.
 - .3 Working time for this work is included in the contract.
- 2.2 CALLBACK AND REPAIR SERVICE**
- .1 The *Contractor* shall maintain and provide a callback and repair services in case of breakdown as prescribes in this section.
 - .2 Callback services
 - .1 Provide a telephone service line monitoring for incoming calls at all times.
 - .2 Include callback services during regular working hours.
 - .3 The technicians responsible of the building shall permanently be equipped with a telecommunication device so that the *Contractor* can contact and assign him to the service call.
 - .4 Any emergency work started at regular time shall be completely completed free of charge if *Departmental Representative* requires it.
 - .5 The *Contractor* shall maintain a record of all calls, including the date, time, nature of call, work performed and additional work required.
 - .6 Major repair that would normally take more than 8 hours/team (eg. A motor rewinding, replacement of hoistropes) may be made during regular business hours.
 - .3 Emergency callback services
 - .1 Include all fees for emergency callback services in the cases described below.

- .2 Provide 24 hours emergency callback services in case of, but not limited to, a person trapped in an elevator, simplex elevator is out of service or more than one car in a group is out of service.
- .4 Response Time
 - .1 Ensure a maximum response time, for the arrival of a technician on site, after a service call of Departmental Representative, as described in the table below:

Type of call	Maximum response time
<u>Callback services:</u>	
During regular hours	45 minutes
Outside regular hours	90 minutes
<u>Emergency callback services:</u>	
During regular hours - Emergency	30 minutes
Outside regular hours - Emergency	45 minutes

2.3 TOOLS AND MATERIAL

- .1 Parts on site
 - .1 Maintain, inside a metal cabinet located in the machine room, an inventory of minor replacement parts such as:
 - .1 Light bulbs for the car and hall pushbuttons;
 - .2 A complete car and hall pushbuttons unit;
 - .3 Fuses and relays of each type used in the controller;
 - .4 Commutator brushes for DC motor;
 - .5 Roller guides for hall and car door;
 - .6 Four (4) liters of geared machine oil;
 - .7 Five (5) gallon of hydraulic oil;
 - .8 One (1) gallon of multi-purpose lubricant;
 - .9 Products and cleaning cloths;
 - .10 100 watts light bulbs for the replacement of the top of car and pit lighting.
 - .11 Not Used
- .2 Parts locally
 - .1 Maintain locally an inventory of major replacement parts available within 48 hours such as:
 - .1 A complete set of car roller or shoe guide;
 - .2 A complete set of hall and car door suspension;
 - .3 A complete door operator unit;
 - .4 Microprocessor boards or PLC;
 - .5 Ventilators;
 - .6 Transformers;
 - .7 Brake pads;
 - .8 Door detector unit;
 - .9 Relays and controller parts;
 - .10 Valves.
- .3 Available Tools

- .1 Maintain locally a set of tools and of instruments such as multimeter, tachometer, chain block, oscilloscope, testing weights, pressure manometers, welding equipments and cleaning kit.
- .2 Maintain locally any electronic tools necessary for the programming of the controllers.

2.4 PREVENTIVE MAINTENANCE

- .1 Object
 - .1 The preventive maintenance program consists of a series of activities based on a mixed program of frequency of use and period. If the use of the vertical transport systems is higher than at the time of the contract signature; the periodic maintenance interventions shall be increased.
- .2 Maintenance activities
 - .1 The *Contractor* shall rapidly correct all excessive wear, breakdown or lack of adjustment of any elevator components detected during a maintenance activity.
- .3 Inspection frequency
 - .1 The *Contractor* shall perform preventive maintenance activities identified in the specifications while respecting the frequency and schedule shown in table below (the number of minutes allocated in the table for the activities is considered a minimum per unit and does not include repairs and service calls).

Period	Maintenance Activity		Hydraulic Elevators
Free	Monthly		0.75 hr per period
Free	Quarterly		0.75 hr per period
Free	Biannual		1.25 hr per period
September	Annual		3 hr per period
TOTAL (per unit):			17.5 hr

- .2 Maintenance activities shall always be coordinated with *Departmental Representative*.
- .4 Monthly activities
 - .1 Perform the following tasks on each elevator once a month:
 - .2 Ride each car on its entire travel in both up and down directions and check and correct the following:
 - .1 Ride comfort and vibrations;
 - .2 Unusual noise;
 - .3 Door operation and pre-opening;
 - .4 Pushbutton and indicators operation;
 - .5 Car safety features, including alarm button, and stop switch;
 - .6 Door protective devices operation;
 - .7 Fan and door noise levels.
 - .8 Leveling of the car (acceptable maximum: 6 mm).

- .3 Hall and car doors; Check and correct the following:
 - .1 The positive locks, the mechanical locks and the door contacts;
 - .2 Door reopening device;
 - .3 Hoistway access switch;
 - .4 The eccentrics and door retaining devices;
 - .5 The lower door guides;
 - .6 The roller guides;
 - .7 Clutch, cams and assembly;
 - .8 The suspensions;
 - .9 The door panels attachments;
 - .10 The door closer;
 - .11 Guard parts.
- .4 In the hoistway; Check and correct the following:
 - .1 Unusual noise;
 - .2 Cleanliness;
 - .3 Abnormal vibrations;
 - .4 Clean the pit floor;
 - .5 Pit light;
 - .6 Clean and lubricate the pit equipments (pulley, buffers and others).
- .5 In the cab and car top; Check and correct the following:
 - .1 Clean door mechanisms;
 - .2 Check the door operator;
 - .3 Check the emergency lighting system;
 - .4 Check the door closing force (maximum acceptable: 30 lbs);
 - .5 Check and replace as necessary the light on the inspection unit;
 - .6 Check car and counterweights guides.
 - .7 Make sure the fan is running 24/24 hours and cleaned monthly.
- .6 In the machine room; Check and correct the following:
 - .1 Unusual noise;
 - .2 Cleanliness;
 - .3 Abnormal vibrations;
 - .4 Oil leak.
- .7 Not Used
- .8 In the machine room / Power unit; Check and correct the following:
 - .1 Oil leakage on the power unit;
 - .2 Oil levels in the tank with car at lowest and highest travel point;
 - .3 Oil temperature & color to detect impurity;
 - .4 Condition and tension of drive belts;
 - .5 Power unit operation;
 - .6 Bearings and operation, pump bearing noise;
 - .7 Valves;
 - .8 Wiring connection.
- .9 In the machine room / Controller; Check and correct the following:
 - .1 Over heated or failed parts in the controller;
 - .2 Wiring connection and insulation;

- .3 Relay, drive and other components.
 - .10 Not Used
- .5 Quarterly activities
 - .1 Perform the following tasks on each elevator every three months:
 - .2 In the hoistway; Check and correct the following:
 - .1 Compensation pulley switch;
 - .2 Compensation pulley bearing;
 - .3 Clean the compensation ropes;
 - .4 Check the buffers.
 - .3 Hall and car doors and car top; Check and correct the following:
 - .1 Clean and lubricate, if required, the hoistropes and speed governor ropes;
 - .2 Check the hoistropes tension (maximum acceptable variation: 10 %).
 - .3 Check, clean and lubricate if required, the door tracks, suspension, guides and eccentric of the car doors;
 - .4 Verify and repair if required, the door eccentrics and door retaining devices as well as the clutch, and mobile cams of the hall doors;
 - .5 Check and clean the hall doors;
 - .6 Check, clean and lubricate if required the doors operation mechanisms;
 - .7 Check the car and counterweight roller guides tension.
- .6 Biannual activities
 - .1 Perform the following tasks on each elevator every six months:
 - .1 Check, clean and lubricate if required, the door tracks, suspension, guides, locks, closing device and eccentric of the hall doors;
 - .2 Clean the machine room floor;
 - .3 Clean the dust the controller and change the dust filters;
 - .4 Clean the carbon dust on the machine room equipment;
 - .5 Clean the car top;
 - .6 Check and test the superior and inferior terminal stopping devices including the slowdown switches;
 - .7 Check and repair the hoist rope fasteners, check the hoistropes and speed governor rope diameter and presence of rust to ensure safety.
 - .8 Check, clean and lubricate the car and counterweight safety devices.
 - .9 Check packing of the cylinder head to detect leaks;
 - .10 Test the communication system and submit a report to Departmental Representative.
- .7 Annual activities
 - .1 Perform the following tasks on each elevator every year:
 - .1 Perform all the performance level testing as describe in the specifications;
 - .2 Perform all the testing prescribe at Section 8 of the ASTM A17.1-2010/CSA B44-2010 code;
 - .3 Check the connection in the controller;
 - .4 Check the overload relay in the controller;
 - .5 Check travelling cables condition;

- .6 Disassemble and clean all the components of the machine brake and performed the testing prescribe at Section 8 of the ASTM A17.1-2010/CSA B44-2010 code.
- .7 Check and clean all the components of the auxiliary brake (rope brake) and performed the testing prescribe at Section 8 of the ASTM A17.1-2010/CSA B44-2010 code.
- .8 Check the relief valve setting as required by article 8.11.3.2.1 of ASTM A17.1-2010/CSA B44-2010 code.
- .9 Check the cylinders as required by article 8.11.3.2.2 of ASTM A17.1-2010/CSA B44-2010 code.
- .10 Provide assistance to *Departmental Representative* for testing of the emergency power system and repair if necessary.
- .11 Perform real time testing of Emergency Operation (Emergency Recall Operation - Phase I & Emergency In-car Operation - Phase II) and emergency power operation with *Departmental Representative*.
- .12 Include all fees for assistance to *Departmental Representative* for testing of the emergency power system and fire alarm system including verification of smoke detector in the hoistway.

2.5 MANEUVERS

- .1 The *Contractor* shall maintain operation and performance levels as described in the related sections.

2.6 CRITERIAS AND METHODOLOGY

- .1 Hoistropes
 - .1 A yearly detailed report shall be submitted to *Departmental Representative* on the condition of the hoistropes.
 - .2 Replace the entire set of ropes if one of the following conditions appears:
 - .1 The rope diameter is lower than what is allowed for the corresponding nominal diameter as per the following table:

Nominal	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"
Minimum	11/32"	13/32"	15/32"	17/32"	37/64"	41/64"	45/64"

- .2 In absence of corrosion, if the number of broken wires per rope lay exceed the following values:

Rope construction	Uniformly distributed broken wires	Broken wires predominate in one or two strands
6 x 19 6 x 21 6 x 25	24	8
8 x 19 8 x 21 8 x 25	32	10

- .3 In presence of corrosion, if the number of broken wires per rope lay exceed 50% of the value shown in article 2.6.1.2.2 or if a 50% reduction of the diameter gap of the article 2.6.1.2.1.
- .3 The length of a rope lay is determined as follow:

Nominal	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"
Length	2-1/2"	2-7/8"	3-1/4"	3-5/8"	4-1/16"	4-1/2"	4-7/8"

- .2 Governor ropes
 - .1 A yearly detailed report shall be submitted to *Departmental Representative* on the condition of the governor ropes.
 - .2 Replace the ropes if one of the following conditions appears:
 - .1 The rope diameter is lower than what is allowed in article 2.6.1.2.1.
 - .2 In absence of corrosion, if the number of broken wires per rope lay exceed 75% of the maximum allowed in article 2.6.1.2.2.
 - .3 In presence of corrosion, if the number of broken wires per rope lay exceed the maximum allowed in article 2.6.1.2.3.
- .3 Rotating elements balancing
 - .1 Foresee that the machine and the motor are perfectly balanced and aligned in order to limit to 1/1000" the vibrations at the end of the motor.
 - .2 Limit the horizontal play and the gear play to a maximum of 5/1000" at balance load.
- .4 Commutator segments depth
 - .1 Maintain a depth of 0.794 mm to 1.191 mm for the commutator segments.
- .5 Commutator brushes
 - .1 Replace the entire set of commutator brushes if worn out more than 60% of the original length.
 - .2 Adjust the commutator brush holder in order to maintain a pressure force of four (4) pound per square inch.
- .6 Methodology
 - .1 **Car speed (seconds):** Measured in feet/minute and at constant speed. A variation of 5% is acceptable.
 - .2 **Operating times (seconds):** Measured from the time doors closing cycle begins until doors are three quarters opened at next floor, assuming a maximum floor height of 13 feet. A variation of 5% is acceptable.
 - .3 **Door opening / closing times (seconds):** Measured from the time doors start to open / close until the doors are fully opened / close.
 - .4 **Doors dwell times (seconds):** Measured from the time doors are fully opened until the door closing cycle starts. A variation of 10% is acceptable.
 - .5 **Doors nudging times (seconds):** Measured from the time doors are fully opened until the reopening device has been rendered inoperative and sound signal activated. A variation of 10% is acceptable.
 - .6 **Noise level ambient:** Measure in dBa within the cab when parked at typical landing with fan on at low speed, using scale A of an ANSI type 2 sound level meters.
 - .7 **Noise level door motion:** Measure within the cab during a complete door cycle, using scale A of an ANSI type 2 sound level meter. A variation of 10% is acceptable.
 - .8 **Noise level running:** Measure within the cab from bottom to top of hoistway, using scale A of an ANSI type 2 sound level meter. A variation of 10% is acceptable.
 - .9 **Leveling distance:** Measured in mm, this is the distance between car sill and landing sill at the moment the doors are fully opened.
 - .10 **Pre-opening distance:** Measured in mm, this is the distance between car sill and landing sill at the moment the doors start to open.

- .11 **Door force:** Door closing force is measured in pounds.
- .12 **Starts / Stops:** Acceleration / deceleration are rated (N) normal, (L) light, (M) medium or (H) high
- .13 **Ride comfort:** Lateral acceleration are rated (N) normal, (L) light, (M) medium or (H) high

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION