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**SPECIFICATIONS:**

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**End of Section**

**1 SUMMARY OF WORK**

.1 This contract must cover removing and replacing the existing elevator equipment including hydraulic power unit and control components, refurbishing the entire cab of the elevator, including all car controls, controls for each floor, door actuators and sensors, and complete retrofit of the interior of the cab and all elevator controls and systems and as shown on drawings.

**Drawing AE1: Elevator Cab Removal & Machine Room Plan**

- Remove existing interior cab of the elevator (elevator doors, flooring, walls, ceiling, light fixtures, railings cab station etc.)
- Remove & replace existing elevator controller
- Remove & replace existing elevator jack/piston

**Drawing AE2: Existing/New Level 1 Front Elevation;**

- Provide new Hall Lantern and Position Indicator and remove and replace existing hall station
- Remove and replace existing elevator doors with Stainless Steel

**Drawing AE3: Existing/New Level 1 Rear Elevation;**

- Remove and replace existing hall station
- Remove and replace existing elevator doors with Stainless Steel

**Drawing AE4: Existing/New Second Floor Elevation;**

- Remove and replace existing hall station
- Remove and replace existing elevator doors with Stainless Steel

**Drawing AE5: New Third & Fourth Floor Elevation;**

- Remove and replace existing hall station
- Remove and replace existing elevator doors with Stainless Steel

**Drawing AE6: General Notes**

.2 Refer to each drawing for a complete description of work and complete all work in accordance with the Contract drawings and Specifications

.3 Refer to specifications section 14 21 00 Hydraulic Elevators for complete inventory list of elevator part replacement.

.4 Within 21 days of contract award the Elevator Contractor is to produce a detailed TSSA compliance/deficiency report detailing any work outside of the completed work under this contract that remains to be carried out to comply with TSSA requirement

.5 The building is to strictly adhere to the latest version of all governing codes and authorities including but not limited to: Ontario Building Code, National Fire Code, Ontario Electrical Code, ASHRAE, National Building Code of Canada and CAN/CSA B72-M87 (R2013)

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- 2 SITE CONDITIONS**
- .1 Contractor to verify locations of all existing services.
  - .2 Dedicated on-site parking must be indicated to the Contractor by the Departmental Representative.
  - .3 Materials pertinent to immediate future use must be stored on site only. No interference of facility operation will be permitted. Dedicated area will be indicated to contractor by the Departmental Representative prior to commencement of work.
  - .4 Contractor is solely responsible for all construction aids, hoisting equipment, and all items necessary to complete entire scope of work.
  - .5 Construction may take place during normal working hours. If construction poses a disturbance and safety issue to standard facility operation, work must take place after normal working hours at no additional expenses.
- 3 DEBRIS**
- .1 During construction, the trades must remove from the project site debris caused by their work immediately. All debris removed must be at the Contractors expense. No On-Site refuse bins must be used unless approval received in writing by the Departmental Representative.
  - .2 The Contractor must enforce the requirements of this Specification, regulatory authorities and specific requests, which the Departmental Representative may issue.
  - .3 Bulk containers which the Contractor may provide for assembly of debris must: be placed in a convenient area not obstructing normal operations, be covered or otherwise protected, be emptied when full but at a time not obstructing the use of the grounds. Coordinate efforts to remove debris with the Departmental Representative.
- 5 OCCUPATIONAL HEALTH AND SAFETY ACT**
- .4 The Contractor must provide a staff person on site who is knowledgeable in the obligations of the Act and will ensure that the requirements of the Act are fully complied with.
  - .5 It is specifically drawn to the attention of the Contractor that the Occupational Health and Safety Act provides in addition to other matters that;
    - A Constructor must ensure that, on a project undertaken by the Constructor that the measures and procedures prescribed by this at and Regulations, are carried out on this project.
    - Every employer and every Worker performing work on the project complies with the Act and the Regulations and
    - The Health and Safety of Workers on the project is protected.
    - The Contractor must pay all such assessments as will protect him from claims under the Workplace Safety and Insurance Act.
- 6 HEALTH AND SAFETY QUALIFICATIONS**
- .6 The Successful Contractor must supply the following documents;
    - Workers Safety & Insurance Board CAD rating and Certificate of Clearance.
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- Certificate of Clearance documentation is to remain current throughout the course of the project with updated certificates submitted to the Departmental Representative.
- Copy of the Signed Contractors Health and Safety Policy with proof of training and listing of programs developed that support the Policy Statement.
- A copy of Proof of Training for each employee, by a valid first aid instructor to show compliance with Workplace Safety & Insurance Act Regulation 110 showing the level of training and expiry dates, and details of level of First Aid supplies present at work site are required. A signed statement by the Contractor attesting to compliance with the following:
  - WHMIS Regulations including proof of annual refresher all for personnel.
  - Occupational Health and Safety Act
  - Specifically, that all engaged in the project have completed the 'Basics of Fall Protection' training program by the Construction Safety Association of Ontario
  - Personal protective equipment required by provincial legislation and the Departmental Representative's requirements-including but not limited to:
    - Class B Hard Hat
    - Approved CSA Footwear
    - Approved CSA Hearing Protection where necessary
    - Approved Safety Glasses

**7 COOPERATION AND PROTECTION**

- .7 The Contractor must cooperate fully with other Contractors or Workers sent onto the Place of Work.
- .8 Perform Work with a minimum disturbance to occupants, public and normal use of the premises.
- .9 The Contractor must give the required notices and must comply with the laws, ordinances, rules, regulations, codes and orders of Authorities having jurisdiction that relate to the Work, the preservation of public health and to construction safety.
- .10 The Contractor will comply with the requirements of the current building use. All required documents are available for study from the Departmental Representative. Make all provisions for required training from the Departmental Representative.
- .11 The Contractor must be solely responsible for construction safety at the place of the Work.

**8 CONTROLLED PRODUCTS**

- .12 The Contractor must ensure that where substances classified as controlled products under the Control Products Regulations are to be used at the place of the Work, the Contractor must ensure that his employees receive appropriate training as per Provincial/Federal Regulations and the Workplace Hazardous Materials Information System (WHMIS).

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- .13 The Contractor must ensure that all controlled products are identified to the Departmental Representative and must obtain Material Safety Data sheet (MSDS) for controlled products, which must be made available at the place of Work.
- .14 Departmental Representative must be advised when controlled products are brought onto the place of Work.
- 9 QUALITY CONTROL** .15 Upon award of Contract the Contractor, if requested, must submit to Departmental Representative a quality management plan indicating quality goals, objectives and implementation processes and proposed reporting mechanisms.
- 10 RECORD DRAWINGS** .16 After award of Contract, Departmental Representative will provide a set of drawings for purpose of maintaining record drawings. Accurately and neatly record deviations from Contract Documents caused by site conditions and changes ordered by the Departmental Representative. Use sharp red pencil indicating all deviations from contract documents.
- .17 Identify drawings as "Project Record Copy". Maintain in new condition and make available for inspection on site by Departmental Representative. On completion of each phase of Work and prior to final inspection, submit record documents to Departmental Representative.
- 11 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS** .18 Before entering existing premises to carry out Work or to obstruct or take out of use any area of existing premises, or to cause any other interference, request meeting with the Departmental Representative's in order to reach agreement as to time and length of time you may cause interference, possess, obstruct or remove from use any such area or services.
- .19 Provide construction facilities and temporary controls in order to execute work expeditiously. Remove from site all such work after use.
- .20 Telephone: Contractor to make their own arrangements for telephone facilities.
- .21 Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Departmental Representative.
- 12 BARRICADES, PROTECTION and DAMAGES** .22 The Contractor must provide adequate barricades or fences with suitable signage/warning devices to adequately protect the site from trespassers and the general public.
- .23 The Contractor must be responsible for the protection of all adjacent buildings/structures on adjacent properties. Any damages adjacent properties are to be repaired to the satisfaction of the Departmental Representative at the contractor's expense.
- .24 The contractor must be responsible for the protection of any active
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underground and above grade services and utilities. Any damages caused by the contractor's operation must be contractor's responsibility

**13 UTILITIES**

.25 Whenever it is necessary to cut, interfere with, or connect to existing services or facility, do so at hours and time recommended by governing authorities and with minimum disturbance to occupants, pedestrian, vehicular traffic, and public and private property.

.26 The contractor must submit schedules and obtain approvals of each proposed shutdown of active service.

**14 REGULATIONS**

.27 The contractor must comply at all times with all ordinances, bylaws and other acts and regulations from time to time imposed by law as related to the execution of the work under this contract, and must make payments required thereof.

**15 HEALTH and SAFETY**

.28 The contractor must be required to provide such equipment or facilities, and to conduct his operations in such a manner as to meet the requirements of the Occupational Health and Safety Act and Regulations.

.29 The contractor must also develop a suitable health and safety plan to protect his workers and any visitors to the site. The plan must include appropriate provisions to address the hazardous materials identified in the Hazmat reports appended hereto. The plan must be submitted to the Departmental Representative prior to initiating the work.

**16 PERMITS**

.30 The contractor must acquire a building permit and pay for all associated fees. A building department permit for the City is required for this project. This is to include ESA final inspection certificate, and all TSSA certifications. Alternately, in lieu of the building permit, a signed statement that the City of Sault Ste. Marie officially exempts this project from building permit requirements must be provided.

**17 FIRES PROHIBITED**

.31 No debris or other materials must be burned on the lot.

**End of Section**

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**PART 1 - GENERAL**

**1.1 PRECEDENCE**

- .1 Division 1 sections take precedence over technical specification sections in other Divisions of this project manual.

**1.2 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 This contract must cover removing and replacing the existing elevator equipment including hydraulic power unit and control components, refurbishing the entire cab of the elevator, including all car controls, controls for each floor, door actuators and sensors, and complete retrofit of the interior of the cab and all elevator controls and systems and as shown on drawings.

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- .5 The building is to strictly adhere to the latest version of all governing codes and authorities including but not limited to: Ontario Building Code, National Fire Code, Ontario Electrical Code, ASHRAE, National Building Code of Canada and CAN/CSA B72-M87 (R2013)

**1.4 WORK SEQUENCE**

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction

**1.5 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for Work, and for access, to allow:
  - .1 Owner use of facility and equipment at all times
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .4 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

**1.6 OWNER OCCUPANCY**

- .1 Owner will occupy facility workspaces during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

**1.7 ALTERATIONS, ADDITIONS TO EXISTING BUILDING**

- .1 Remove and recycle or dispose of existing fill, building materials, mechanical and electrical items as required.
- .2 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**PART 2 - PRODUCTS**

**2.1 NOT USED**

- .1 Not used.

**PART 3 - EXECUTION**

**3.1 NOT USED**

- .1 Not used.

**End of Section**

**ART 1 - GENERAL**

**1.1 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

**1.2 ALTERATIONS, ADDITIONS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations and occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.3 EXISTING SERVICES**

- .1 Notify Departmental Representative, and utility companies of intended interruption of services and obtain required permission.

**1.4 SPECIAL REQUIREMENTS**

- .1 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.

**1.7 BUILDING SMOKING ENVIRONMENT**

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

**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 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work and at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4 Preside at meetings.
- .5 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .6 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, Departmental Representative.
- .7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.2  
PRECONSTRUCTION  
MEETING**

- .1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 3 days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
  - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Delivery schedule of specified equipment in accordance with Section 01 33 00

**End of Section**

## PART 1 - GENERAL

### 1.1 DEFINITIONS

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

### 1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

**1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

**1.4 MASTER PLAN**

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

**1.5 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Removal of Existing Elevator Equipment
  - .6 Installation of New Elevator Equipment
  - .7 Final site remediation complete
  - .8 Commissioning
  - .9 Substantial completion
  - .10 Closeout

**1.6 PROJECT SCHEDULE REPORTING**

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

**1.7 PROJECT MEETINGS**

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

**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 ADMINISTRATIVE**

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative , in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.
- .11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf. files. Forward pdf files on CD or through email.
- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

**1.2 SHOP DRAWINGS  
AND PRODUCT DATA**

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

- .8 After Departmental Representative's review, distribute copies.
- .9 Submit 2 prints and 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .10 Submit 2 prints and 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit 2 prints and 1 electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit 2 prints and 1 electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit 2 prints and 1 electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit 2 prints and 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .15 Submit 2 prints and 1 electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative .
- .16 Delete information not applicable to project.

- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .19 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

**1.3 FEES, PERMITS  
AND CERTIFICATES**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits.

**PART 2 - PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

End of Section

## 1 General

### 1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure that NRCan shows due diligence towards health and safety on construction sites, and meets the requirements laid out in PWGSC/RPB Departmental Policy DP 073 - Occupational Health and Safety - Construction.

### 1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
  - .1 Occupational Health and Safety Act, R.S.O. [1990 Updated 2005].

### 1.3 SUBMITTALS

- .1 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan
- .2 Submit 4 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly
- .3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4 Submit copies of incident and accident reports.
- .5 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 2 days after receipt of comments from Departmental Representative.
- .6 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .7 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

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- .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
  
  - 1.4 FILING OF NOTICE**
    - .1 File Notice of Project with Ontario Ministry of Labour prior to beginning of Work.
  
  - 1.5 SAFETY ASSESSMENT**
    - .1 Perform site specific safety hazard assessment related to project.
  
  - 1.6 MEETINGS**
    - .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
  
  - 1.7 GENERAL REQUIREMENTS**
    - .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
    - .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
  
  - 1.8 RESPONSIBILITY**
    - .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
    - .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
  
  - 1.9 COMPLIANCE REQUIREMENTS**
    - .1 Comply with Ontario Health and Safety Act, R.S.O.
    - .2 Comply with Occupational Health and Safety Regulations, 1996.
    - .3 Comply with Occupational Health and Safety Act, General Safety Regulations.
    - .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

**1.10 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Ontario Ministry of Labour having jurisdiction and advise Departmental Representative verbally and in writing.

**1.11 HEALTH AND SAFETY  
CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to activities associated with working at heights and roof railing installations.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work

**1.12 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Ontario having jurisdiction, and in consultation with Departmental Representative.

**1.13 CORRECTION OF  
NON-COMPLIANCE**

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

**1.14 WORK STOPPAGE**

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

**END OF SECTION**

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- |                                  |    |   |
|----------------------------------|----|---|
| <b>1 GENERAL</b>                 | .1 | Comply with Division 1 requirements and documents referred to therein.  |
| <b>2 DESCRIPTION</b>             | .1 | This Section covers work for protection of environment as applicable to this Project.   |
|                                  | .2 | Provisions of this Section supplement requirements of Contract Documents.   |
| <b>3 ENVIRONMENTAL PRACTICES</b> | .1 | Implement environmentally sound practices in this Project by incorporating products that lessen burden on environment in production, use and final disposition. Support implementation of reduction, reuse and recycling strategies and use of environmentally sound products. Promote use of environmentally responsible packaging practices by reducing and/or eliminating products with excessive packaging in this Project where these practices do not negatively affect the proper protection of materials from inclement weather, especially water damage. |
|                                  | .2 | Employ environmentally sound products, which are made, used and disposed of in a manner that significantly reduces harm to environment. Product selection criteria be based on requirements of CSA Z760, Life Cycle Assessment and CSA Z762 Design for the Environment. Use product which improves energy efficiency in its production and use, reduces hazardous by-products, uses recycled material, and/or product itself can be recycled or reused, and/or in some way is environmentally benign.   |
| <b>4 SITE REVIEW</b>             | .1 | The Ministry of the Environment and other authorities having jurisdiction may visit Site periodically during construction. Where Work does not comply with environmental protection requirements, said authorities have power to issue a stop work order. Departmental Representative's acceptance of Work may be withheld until Ministry of the Environment or other authorities concerned have issued their approval.   |
| <b>5 SITE WORKING AREAS</b>      | .1 | Confine operations to limits of Site working area indicated on Drawings.  |
|                                  | .2 | Provide access roads to Site working area and on Site in locations acceptable to Departmental Representative.   |
|                                  | .3 | Install suitable fencing to clearly define limits of Site working area, haul routes, parking areas, access routes and maintenance areas to ensure construction activity is confined to these areas.   |
| <b>6 NOISE CONTROL</b>           | .1 | Adhere to local noise bylaws.   |
|                                  | .2 | Equip vehicles and equipment with efficient noise attenuation devices (mufflers) to minimize noise levels in vicinity of Site   |
|                                  | .3 | Where necessary place noise attenuation devices (barriers) around stationery pumps and compressors  |

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- |  |    |   |
|--|----|---|
| <b>7 DUST CONTROL</b>  | .1 | Undertake control measures to prevent nuisances due to dust in any phase of construction.   |
|  | .2 | Application of calcium chloride shall be kept to minimum and shall be restricted to vehicle right-of-way. In close proximity to watercourses, frequent applications of water shall be preferred method. Obtain Departmental Representative's approval before chemicals for dust control are used. |
|  | .3 | Transport dusty materials in covered haulage vehicles.  |
|  | .4 | Transport wet materials in suitable watertight haulage vehicles.  |
| <b>8 EQUIPMENT FUELLING, MAINTENANCE AND STORAGE</b>         | .1 | Obtain Departmental Representative's acceptance of refueling areas.   |
|  | .2 | Procedures for interception and rapid clean up and disposal of fuel spillages shall be submitted to Departmental Representative for review prior to starting Work.  |
|  | .3 | Ensure that materials required for clean up of fuel spillages are readily accessible on Site at all times.  |
|  | .4 | Carry out refueling of equipment at acceptable refueling areas.   |
|  | .5 | Ensure that water used for cleaning of equipment does not drain into streams, lakes or watercourses. Do not empty fuel, lubricants and/or pesticides into any watercourse, or on ground.  |
|  | .6 | Clean construction equipment prior to entering public roadways to prevent littering. Debris from cleaning equipment shall not be permitted into storm sewers or watercourses.   |
|  | .7 | Store equipment and materials in orderly manner and in location acceptable to Departmental Representative   |
| <b>9 SPILLS REPORTING</b>                                    | .1 | In event of spill or other emission of pollutant into natural environment, notify:  |
|  | .1 | Local office of the Ministry of Environment and MOE Spill Action Centre (SAC),  |
|  | .2 | Municipality or Regional Municipality within boundaries of which spill occurred,  |
|  | .3 | Person having control of pollutant, if known, of spill, of circumstances surrounding the spill and of any action taken or intended to be taken.   |
| <b>10 CONTINGENCY PLAN FOR CONTROL AND CLEAN-UP OF SPILL</b> | .1 | Prior to commencing construction, prepare contingency plan for control and clean up of spills. Contingency plan to include:   |
|  | .1 | Names and telephone numbers of persons in local municipalities and MOE to be notified forthwith of spill.   |

- .2 Names and telephone numbers of representatives of fire, police and health departments of local municipalities who are responsible to respond to emergency situation.
  - .3 Names and telephone numbers of companies experienced in control and clean up of hazardous materials that would be called upon in emergency involving spill.
  - .4 Contingency plan shall include provisions for spills of hazardous or unknown materials (i.e. puncturing on unmarked drain during excavation).
  - .5 Proposal for immediate containment and control of spill; clean up procedures to be initiated immediately and any other action to be taken to mitigate potential environmental damage while awaiting additional assistance
- .2 Be responsible for preparing, implementing, directing and supervision of contingency plan.
  - .3 Ensure immediate availability of products with which to effect temporary repair to broken pipelines and other services so spill or other emission of pollutant is immediately controlled and stopped and to mitigate damages.
  - .4 Submit for Departmental Representative's review copy of Contingency Plan and make appropriate changes as requested.

**12 WASTE DISPOSAL**

- .1 Do not burn rubbish on Site. Obtain approval, and use following off-site disposal alternatives, depending upon materials involved; burying, composting, recycling, municipal collection, or local dump or sanitary landfill site.

**End of Section**

**PART 1 - GENERAL**

**1.1 REFERENCES AND  
CODES**

- .1 Perform Work in accordance with latest edition of National Building Code of Canada (NBC), Canadian Standards Association (CSA), ASME/CSA A17.1 Safety Code For Elevators And Escalators, and National Fire Code of Canada (NFC) and Ontario Building Code, including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
  
- .3 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

**1.3 BUILDING  
SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions and municipal by-laws.

**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 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

### **1.2 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Services must be engaged by the contractor for the purpose of inspecting and or testing portions of the work.
- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

### **1.3 ACCESS TO WORK**

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

### **1.4 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

### 1.5 REJECTED WORK

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

### 1.6 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

### 1.7 TESTS AND MIX DESIGNS

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

### 1.8 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative as specified in specific Section.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.

**1.9 EQUIPMENT AND SYSTEMS**

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment, systems as requested by Departmental Representative.

**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 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
  - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

### 1.2 SUBMITTALS

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

### 1.3 INSTALLATION AND REMOVAL

- .1 Indicate use of supplemental or other staging area.
- .2 Provide construction facilities in order to execute work expeditiously.
- .3 Remove from site all such work after use.

### 1.4 HOISTING

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

### 1.5 SITE STORAGE/LOADING

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

### 1.8 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

**1.9 SANITARY  
FACILITIES**

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

**1.10 CONSTRUCTION  
SIGNAGE**

- .1 No other signs or advertisements, other than warning signs are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

**1.11 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Store materials resulting from demolition activities that are salvageable.
- .3 Stack stored new or salvaged material not in construction facilities.

**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 SUBMITTALS**
- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit written request in advance of cutting or alteration which affects:
    - .1 Structural integrity of elements of project.
    - .2 Integrity of weather-exposed or moisture-resistant elements.
    - .3 Efficiency, maintenance, or safety of operational elements.
    - .4 Visual qualities of sight-exposed elements.
    - .5 Work of Owner or separate contractor.
  - .3 Include in request:
    - .1 Identification of project.
    - .2 Location and description of affected Work.
    - .3 Statement on necessity for cutting or alteration.
    - .4 Description of proposed Work, and products to be used.
    - .5 Alternatives to cutting and patching.
    - .6 Effect on Work of Owner or separate contractor.
    - .7 Written permission of affected separate contractor.
    - .8 Date and time work will be executed.
- 1.2 MATERIALS**
- .1 Required for original installation.
  - .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures
- 1.3 PREPARATION**
- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
  - .2 After uncovering, inspect conditions affecting performance of Work.
  - .3 Beginning of cutting or patching means acceptance of existing conditions.
  - .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
  - .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

**1.4 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .7 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .8 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

**1.5 WASTE  
MANAGEMENT AND  
DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 00 01 General Requirements

**PART 2 - PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**End of Section**

## PART 1 - GENERAL

### 1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Provide on-site containers for collection of waste materials and debris.
- .7 Provide and use marked separate bins for recycling. Refer to Section 01 00 01 General Requirements.
- .8 Dispose of waste materials and debris at designated dumping areas off site.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

### 1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors and.
- .9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .10 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .11 Remove dirt and other disfiguration from exterior surfaces.
- .12 Sweep and wash clean paved areas.
- .13 Clean roofs, downspouts, and drainage systems.

**1.4 WASTE  
MANAGEMENT AND  
DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 00 01 General Requirements.

**PART 2 - PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 - EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**End of Section**

**PART 1 - GENERAL**

- 1.1 RELATED REQUIREMENTS**
- .1 01 33 00 Submittal Procedures
  - .2 01 78 00 Closeout Submittals
- 1.2 ADMINISTRATIVE REQUIREMENTS**
- .1 Acceptance of Work Procedures:
    - .1 Contractor's Inspection: Contractor : conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
      - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
      - .2 Request Departmental Representative inspection.
    - .2 Departmental Representative Inspection:
      - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
      - .2 Contractor to correct Work as directed.
    - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
      - .1 Work: completed and inspected for compliance with Contract Documents.
      - .2 Defects: corrected and deficiencies completed.
      - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
      - .4 Certificates required by TSSA and other applicable authorities: submitted.
      - .5 Operation of systems: demonstrated to Owner's personnel.
- 1.3 FINAL CLEANING**
- .1 Clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
  - .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 00 01- General Requirements.

**PART 2 - PRODUCTS**

- 2.1 NOT USED**
- .1 Not Used.

**PART 3 - EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**End of Section**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        01 33 00 – Submittal Procedures
- .2        01 77 00 – Closeout Procedures

**1.2                SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3        Revise content of documents as required prior to final submittal.
- .4        Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.
- .5        Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6        Furnish evidence, if requested, for type, source and quality of products provided.
- .7        Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8        Pay costs of transportation.

**1.3                FORMAT**

- .1        Organize data as instructional manual.
- .2        Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3        When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4        Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5        Arrange content by systems under Section numbers and sequence of Table of Contents.
- .6        Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7        Text: manufacturer's printed data, or typewritten data.

- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide [1:1] scaled CAD files in dwg format on CD.

#### **1.4 CONTENTS - EACH VOLUME**

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

#### **1.5 AS-BUILTS AND SAMPLES**

- .1 Maintain in addition to requirements in General Conditions, at site for Owner one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

- .5 Keep record documents and samples available for inspection by Departmental Representative.

## **1.6 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

## **1.7 EQUIPMENT AND SYSTEMS**

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .3 Provide servicing and lubrication schedule, and list of lubricants required.
- .4 Include manufacturer's printed operation and maintenance instructions.

- .5 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .6 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .7 Additional requirements: as specified in individual specification sections.

## **1.8 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

## **1.9 SPARE PARTS**

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

## **1.10 MAINTENANCE MATERIALS**

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

## **1.11 SPECIAL TOOLS**

- .1 Provide special tools, in quantities specified in individual specification section.

- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

#### **1.12 STORAGE, HANDLING AND PROTECTION**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

#### **1.13 WARRANTIES**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative for approval.
- .3 Warranty management plan to include required actions and documents to assure that Owner receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
  - .1 Separate each warranty with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.

- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roof railing system, lightning protection systems.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
    - .11 Organization, names and phone numbers of persons to call for warranty service.
    - .12 Typical response time and repair time expected for various warranted equipment.
  - .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
  - .5 Procedure and status of tagging of equipment covered by extended warranties.
  - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

**1.14 PRE-WARRANTY CONFERENCE**

- .1 Meet with Departmental Representative, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Departmental Representative.
- .2 Departmental Representative will establish communication procedures for:
  - .1 Notification of construction warranty defects.
  - .2 Determine priorities for type of defect.
  - .3 Determine reasonable time for response.
- .3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.
- .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

**1.15 WARRANTY TAGS**

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
  - .1 Type of product/material.
  - .2 Model number.
  - .3 Serial number.
  - .4 Contract number.
  - .5 Warranty period.
  - .6 Inspector's signature.
  - .7 Construction Contractor.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**1 SUMMARY**

- .1 Section includes: Component retrofit on West Wing Elevator. All equipment listed under 14 21 00 is to be non-proprietary.
- .2 Elevator work per unit is as below; and as per drawings

**GLFC West Wing Elevator**

• **(1) Hydraulic Jack/Piston**

New jack/piston assembly c/w code compliant pvc jacket and cathodic corrosion protection. New jack/piston assembly to match existing capacity & travel. Contractor to verify existing jack/piston specifications on site.

• **(1) Elevator Power Unit.**

Complete new hydraulic power unit, 4000 lbs capacity, 75 fpm speed, compact design. New power unit to be match existing unit output specifications, contractor to verify existing specifications onsite.

• **(1) VVVF Car Controller**

Redundancy protection to verify correct operation of all critical system components, monitoring and prevention of elevator operation with faulty door contact circuits(anti-jumper protection), geared and gearless installations for AC/DC motors using digital drive technology, direct flight: dual loop flight controls improves flight times, position and speed control, absolute position, stepping, slow downs, and speed functions, on-board diagnostics with LCD display and keypad, phase loss/phase reversal protection, full compliance with CSA B44/ASME/AS 1735.2 all north American states, Provincial and Local Codes

• **(1) Stainless Steel Car Station**

Applied main COP with hands free phone, LED display, signage: capacity and elevator number, no smoking, fire instructions (per code), blue pushbuttons, blue position indicator, door open and close buttons, alarm button, standard key switches located in service cabinet and emergency light, recessed duplex receptacle

• **(1) Car Direction indicator with LED Clusters**

- **(1) 6" x 28" hall station to be finished SS surface mounted with integral appendix H/O and fire services features, vandal resistant pushbuttons (Buttons LED Blue) complete with bilingual wording and brail.**

- **(4) 6" x 24" hall station with integral appendix H/O vandal resistant pushbuttons, bilingual wording and brail. (Buttons LED Blue) as follows:**

- **Level 1 Rear - Single Arrow**
  - **Second Floor – Double Arrow**
  - **Third Floor - Double Arrow**
  - **Fourth Floor - Single Arrow**
-

- (1) Landing System
- (1) 20" W x 5" H Hall Lantern and Position Indicator Combo – Surface Mount (LED Blue)
- (1) GAL Car Door Operator
- (1) GAL car door clutch/gate switch
- (1) **Car door detection system**  
To have invisible curtain of infrared light beams to detect any object that may be in doorway to prevent door from opening/closing, light curtain from floor to 6 feet
- (1) Voice Annunciator Bilingual c/w Brail Plate
- (1) Manual
- (1) **Cab Interior Package to Include:**

**Walls:** To be Prestige Walnut Wall Panels, stainless steel base/reveal/frieze

**Handrail:** 6" flat bar with returned ends brushed stainless steel finish.

**Ceiling:** LED downlight with brushed stainless steel ceiling.

**Floor:** Hospital grade vinyl sheet flooring. All cab prep including sub-floor preparation to be by elevator contractor. Finish flooring to be installed by owner.

**Accessories:** Protective cab curtains and all associated hardware.

**Door & Sill:** New two-speed door, left hand opening brushed stainless steel door and new aluminum sill on front and rear of cab.

**Front Return & Fixtures:** Full width wrap around return, brushed stainless steel front modfusion fixtures.

## 2 SUBMITTALS

- .1 Product data: submit product data for the following:  
Elevator GAL door operators and multi beam detectors
- .2 Certificates: Inspection and acceptance certificates of elevator system installation. **Contractor is responsible for all TSSA inspections and associated costs.**
- .3 Operation and maintenance data: Include three sets of following:  
Operating and Maintenance Manuals, Parts list with recommended parts inventory.

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- 3 QUALITY ASSURANCE**
- .1 Manufacturer Qualifications: As indicated above.
  - .2 Regulatory Requirements:
    - CAN/CSA-B44-04 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
    - Ontario Building Code latest edition
    - Canadian Electrical Code
  - .4 Inspection and testing: Elevator installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation. Arrange for inspections and make required tests, deliver to the Owner upon completion and acceptance of elevator work.
- 4 DELIVERY, STORAGE AND HANDLING**
- .1 Deliver elevator materials, components and equipment in manufacturer's protective packaging.
  - .2 Store materials in a dry protected area provided by others. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.
  - .3 Dispose of old equipment in a proper manner.
- 5 WARRANTY**
- .1 Furnish call back service for a period of 12 months from time of the turnover of the final elevator to the owner. Following the upgrades the installing company will be responsible for call-backs or service requests on the new equipment only.
  - .2 Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
  - .3 Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts.
- 6 EXAMINATION**
- .1 Before starting elevator upgrades, inspect hoistway openings, pits and machine rooms, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until satisfactory conditions have been corrected in a manner acceptable to the installer. Provide hoarding as indicated on the drawings.
- 7 INSTALLATION**
- .1 Perform Work with a minimum disturbance to occupants, public and normal use of the premises.
  - .2 Perform work with competent, skilled workmen under the direct control and supervision of the elevator.
-

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- 8 FIELD QUALITY CONTROL** .1 Acceptance testing: Upon completion of the elevator component installation and before submitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.
- .2 Advise Owner, Consultant, and governing authorities in advance of dates and times tests are to be performed on elevator.
- 9 ADJUSTING** .1 Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately
- 10 CLEANING** .1 Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided.
- .2 At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
- 11 PROTECTION** .1 At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

**END OF SECTION**

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## 1 General

### 1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1-[06], Canadian Electrical Code, Part 1 (24th Edition), Safety Standard for Electrical Installations.
  - .2 CSA C22.2 No.
  - .3 CAN/CSA-C22.3 No. 1-[01(Update March 2005)], Overhead Systems.
  - .4 CAN3-C235-[83(R2000)], Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
  - .1 EEMAC 2Y-1-[1958], Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
  - .1 IEEE SP1122-[2000], The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

### 1.2 DEFINITIONS

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

### 1.3 DESIGN REQUIREMENTS

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

### 1.4 SUBMITTALS

- .4 Use one nameplate or label for both languages.
- .1 Submit required documentation in accordance with 01 33 00 - Submittal Procedures.
- .2 Submit for review single line electrical diagrams and locate as indicated.
  - .1 Electrical distribution system in main electrical room.
- .3 Shop drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping,

- .3 ductwork, and other items that must be shown to ensure co-ordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Submit four (4) copies of 600 x 600 mm minimum size drawings and product data to the Departmental Representative.
- .6 If changes are required, notify the Departmental Representative of these changes before they are made.
- .7 Submit shop drawings in accordance with 01 33 00 - Submittal Procedures and as specified in each section of Division 26.
- .8 When equipment and apparatus of 1 system must be co-ordinated with or installed in a given area with equipment and apparatus of other system(s), prepare and submit necessary co-ordinated composite drawings for checking interferences.

- .4 Quality Control Submittals.
  - .1 Provide CSA certified equipment and material.
  - .2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for approval before delivery to site.
  - .3 Submit test results of installed electrical systems and instrumentation.
  - .4 Permits and fees: in accordance with General Conditions of contract.
  - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
  - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to the Departmental Representative.

- .5 Manufacturer's Field Reports: submit to the Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work.

#### 1.5 OPERATION AND MAINTENANCE DATA

- .1 Submit operation and maintenance data. Make changes or submit additional information if required.
- .2 Review instructions with the Departmental Representative to ensure a thorough understanding of equipment and its operation.

#### 1.6 QUALITY ASSURANCE

- .1 Qualifications: electrical Work to be carried out by qualified, licensed electricians hold valid Master Electrical Contractor license in accordance with authorities having jurisdiction as per the conditions of Ontario Act respecting manpower vocational training and qualification.

- .2 Work on signal, communication, related control and other similar systems shall be performed by relevant competent tradesmen.
- .3 Examine Site and Contract Documents in accordance with Instructions to Bidders.
  - .1 Electrical installations in areas classified as hazardous locations, corrosive environments, and other special area application, shall be governed by relevant Industry Standards and Regulatory Requirements
    - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
    - .2 Twice during progress of Work at 50% and 100% complete.
    - .3 Upon completion of Work, after cleaning is carried out.

### 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide the Departmental Representative with schedule within 2 weeks after award of Contract.

### 1.8 SYSTEM STARTUP

- .1 Instruct the Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

### 1.9 OPERATING INSTRUCTIONS

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
  - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
  - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
  - .3 Safety precautions.
  - .4 Procedures to be followed in event of equipment failure.
  - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

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

## 2 Products

### 2.1 MATERIALS AND EQUIPMENT

- .1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction inspection authorities before delivery to site and submit such approval as described in PART 1 – SUBMITTALS and in accordance with 01 33 00 - Submittal Procedures.
- .2 Factory assembled control panels and component assemblies.
- .3 Inserts: Supply and deliver inserts, anchors, bolts, sleeves, ferrules and other items to be built into work of other Divisions, with necessary templates, adequate instructions and assistance for locating and installing
- .4 Access Panels: For ceilings and/or masonry walls, 12 gauge steel, size 460 mm x 460 mm unless indicated on Drawings, concealed hinges, key-locked type, prime coated, to match ceiling and/or wall finish.
- .5 "Lamicoid" Nameplates: 3 mm thick, white capitalized inscribed letterings against black background, sized to accommodate specified nomenclature, as described in other Sections of Division 16, or as indicated on Drawings.
- .6 Wall Mounting Panels: 19 mm thick minimum, "Fir" plywood panel, good 1-side painted with [fire-retardant][2-coats standard equipment grey colour], cut size to suit, for group-mounting any combinations of surface wall-mounted enclosed disconnect switches and/or circuit breakers, motor starters and/or contractors, small control cabinets or control panels, utility metering cabinets, and other similar device enclosures.

### 2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

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

### 2.3 WIRING TERMINATIONS

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

## 2.4 EQUIPMENT IDENTIFICATION

- .1 Electrical equipment and auxiliaries shall be identified in accordance with designations indicated on Drawings or as specified in other Sections of Division 26.
- .2 Identify electrical equipment, control cabinets, panels, enclosures, switchboards, switchgears, motor control centres, starters, designated boxes, and other similar items, using Lamicaid plates
- .3 Fasten Lamicaid nameplates using self-tapping screws for metal sheet enclosures or glued to PVC or fibreglass construction.
- .4 Panelboards shall have Lamicaid plates mounted on top outside trim of door indicating function and voltage of panelboard.
- .5 Disconnect switches and motor starters shall have Lamicaid nameplates mounted on front cover indicating name of equipment, horsepower, voltage and phase.
- .6 Terminal boards, blocks, and strips, shall have group marker and indexed markers, as applicable.
- .7 Mark clearly and permanently all feeder phase identifications at both ends, using standard colour or letter designations.
- .8 Identify wiring, as required, using standard indelible wire markers at each termination, in accordance with schematic and/or connection wiring diagrams.
- .9 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .10 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .11 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .12 Terminal cabinets and pull boxes: indicate system and voltage.
- .13 Transformers: indicate capacity, primary and secondary voltages.

## 2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.

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

**2.6 CONDUIT AND CABLE IDENTIFICATION**

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

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

**2.7 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Paint outdoor electrical equipment "equipment green" finish.
  - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1
  - .3 Touch up minor chips or damage to electrical equipment, installed in this Division, with standard, factory supplied, enamel finish.
  - .4 Colour code, as specified herein, outlet boxes, pull boxes, junction boxes by applying a small dab of paint to inside of each item during installation.
  - .5 Colour code, as specified herein, all exposed ducts, conduits, outlet boxes, and similar items by applying a 25 mm wide band of paint around ducts and conduits adjacent to boxes described in above paragraph and on both sides of wall penetration.
  - .6 Priming and finish painting of exposed unfinished raceways, fitting, outlet boxes, junction boxes, pull boxes and similar items.

**3 Execution**

**3.1 EXAMINATION**

- .1 Where any parts of systems and/or pieces of equipment are located by dimensions on drawings, check and verify such dimensions at site.
- .2 Notify the Departmental Representative before proceeding further if any discrepancy or interference with other equipment is found which will necessitate revision in or deviation from Work as indicated or specified.
- .3 Location of conduit, raceways, wiring and other equipment shall be altered without charge to the Departmental

Representative if so directed by the Departmental Representative provided change is ordered before installation, and does not necessitate additional labour and material.

### 3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.
- .3 Electrical equipment and auxiliaries shall be identified in accordance with designations indicated on Drawings or as specified in other Sections of Division 26.
- .4 Correct installed work as directed by authorized inspector of such authorities.
- .5 Notwithstanding the General Conditions of the Contract, no increase to Contract Price shall apply for electrical items relocated from location indicated and prior to installation requiring extra labour and material up to 3meters from original location, nor will decrease to Contract Price apply where relocation up to 3 meters reduces materials and labour.

### 3.3 EQUIPMENT IDENTIFICATIONS

- .1 Electrical equipment and auxiliaries shall be identified in accordance with designations indicated on Drawings or as specified in other Sections of Division 26.
- .2 Identify electrical equipment, control cabinets, panels, enclosures, switchboards, switchgears, motor control centres, starters, designated boxes, and other similar items, using Lamicaid plates.
- .3 Fasten Lamicaid nameplates using self-tapping screws for metal sheet enclosures or glued to PVC or fibreglass construction.
- .4 Panelboards shall have Lamicaid plates mounted on top outside trim of door indicating function and voltage of panelboard.
- .5 Disconnect switches and motor starters shall have Lamicaid nameplates mounted on front cover indicating name of equipment, horsepower, voltage and phase.
- .6 Terminal boards, blocks, and strips, shall have group marker and indexed markers, as applicable.
- .7 Mark clearly and permanently all feeder phase identifications at both ends, using standard colour or letter designations.

- .8 Identify wiring, as required, using standard indelible wire markers at each termination, in accordance with schematic and/or connection wiring diagrams

### 3.4 PAINTING WORK

- .1 Touch up minor chips or damage to electrical equipment, installed in this Division, with standard, factory supplied, enamel finish.
- .2 Colour code, as specified herein, outlet boxes, pull boxes, junction boxes by applying a small dab of paint to inside of each item during installation.
- .3 Colour code, as specified herein, all exposed ducts, conduits, outlet boxes, and similar items by applying a 25 mm wide band of paint around ducts and conduits adjacent to boxes described in above paragraph and on both sides of wall penetration.
- .4 Priming and finish painting of exposed unfinished raceways, fitting, outlet boxes, junction boxes, pull boxes and similar items.

### 3.5 SYMBOLS

- .1 Electrical work is indicated generally on Drawings using standard symbols.
- .2 For lighting layout Drawings, letters in a circle indicate type of fixture to be supplied. Letters and numbers outside and adjacent to circle indicate panel and circuit number.

### 3.6 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

### 3.7 LOCATION OF OUTLETS

- .1 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .3 Locate light switches on latch side of doors.

### 3.8 MOUNTING HEIGHTS

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

- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
  - .1 Lighting Switches 1200mm
  - .2 Wall Receptacles 400mm
  - .3 Panelboards 1200mm (maximum 1700mm to highest breaker handle)
- .4 Heights are subject to change to suit structural requirements, and other Site conditions, and therefore as work progresses, and before installing equipment, obtain instructions or directions from the Departmental Representative for alternative heights or relocation.

### 3.9 MOUNTING OF EQUIPMENT

- .1 Lighting panels, annunciators, control panels and cabinets, electrical enclosures, boxes, and other similar items, indicated to be installed in areas with finished walls, shall be flush-mounted and fitted with suitable flush trim and doors.
- .2 Lighting panels, annunciators, control panels and cabinets, electrical enclosures, boxes, and other similar items indicated to be installed in pipe spaces or other areas where an exposed type of wiring is specified shall be surface mounted.
- .3 Use wall mounting panel for surface wall group-mounting of electrical control equipment, enclosures, and similar devices as indicated in Drawings, specified herein, or as directed on Site by the Departmental Representative.

### 3.10 GROUNDING

- .1 Ground electrical equipment in accordance with requirements of The Electrical Safety Authority Electrical Safety Code.
- .2 Arrange grounds so that under normal operating conditions, no injurious amount of current will flow in any grounding conductor. Connect single phase loads so that there is least possible unbalance of supply.

### 3.11 CO-ORDINATION OF PROTECTIVE DEVICES

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

### 3.12 FIELD QUALITY CONTROL

- .1 Load Balance:
  - .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
  - .3 Trial usage by Departmental Representative of any electrical device, machinery, apparatus, equipment and other work supplied under this Division before final completion and written acceptance by the Departmental Representative is not to be construed as evidence of acceptance by the Owner.
  - .4 Departmental Representative shall have privilege of such trial usage as soon as Contractor claims that said work is completed, in accordance with Drawings and specifications for such reasonable length of time as Departmental Representative deems sufficient for making a complete test.
  - .5 No claim for damage shall be made for injury to or breaking of any parts of such tested work, whether caused by weakness or inaccuracy of structural parts or by defective materials or workmanship of any kind whatsoever.
  - .6 Provide upon completion of work, load balance report as directed in PART 1 – SUBMITTALS and in accordance with 01 33 00 - Submittal Procedures: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests.
- .1 Power [generation] [and] [distribution] system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Resistance of ground electrodes shall not exceed maximum permissible values for each type of installation or equipment concerned and if necessary change arrangement until satisfactory results are obtained.
  - .5 Voltage provided to equipment in installation shall not exceed minimum and maximum permissible limits for equipment.
  - .6 Test performance of equipment for mechanical and electrical defects. Make adjustments necessary for such equipment. When equipment has been placed in permanent operation give to operating personnel all necessary tuition and instructions for its operation and maintenance.
  - .7 Test conduits that are required to be installed but left empty for clear bore, using ball mandrel, brushes and snake. Use lignum vitae ball of diameter equal to approximately 85% of conduit inside diameter. Clear any conduit that rejects ball mandrel in an approved manner and without damage thereto.
  - .8 Furnish labour, materials, instruments and bear other costs in connection with all tests, obtain required certificates of approval, acceptance, and compliance with regulations of agencies having jurisdiction and as

specified. Work shall not be deemed complete and final certificate of acceptance will not be issued, until such certificates have been delivered to the Departmental Representative

- .3 Carry out tests in presence of the Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 – SUBMITTALS and in accordance with 01 33 00 - Submittal Procedures.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

**3.13 CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

**END OF SECTION**