

ISSUED FOR TENDER

PARKS CANADA

for

CANADIAN HERITAGE/ENVIRONMENT CANADA

PLANS AND SPECIFICATIONS
for

**HOPEDALE MISSION NHS
PROVISIONS WAREHOUSE RECAPITALIZATION
PROJECT #1131**

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Bidder obtaining Tender Documents is responsible for ensuring that he/she is aware of and have complied with any Addenda issued.

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PART 1 **GENERAL**

1.1 **DESCRIPTION OF WORK**

- .1 The Work of the Project is defined by the Contract Documents and involves structural upgrades and associated work to the Provisions Warehouse at the Hopedale Mission National Historic Site to ensure long-term conservation of this building which is designated as a Recognized Federal Heritage Building.
- .2 Associated work includes:
 - .1 Excavation and trenching
 - .2 Supply and install drainage piping
 - .3 Restacking of loose stone foundation substructure
 - .4 Removal and reinstatement of board flooring
 - .5 Demolition of existing timber and wood elements
 - .6 Reinstatement of heavy timber complete with period correct joinery
 - .7 Removal and reinstatement of existing brick nogging.
 - .8 Cleaning and treatment of in-situ existing heavy timber
 - .9 Exterior door and window historic replacements.
 - .10 Custom-made door hardware for exterior doors.
 - .11 Historic painting for exterior door and window replacements.
 - .12 Re-Painting of exterior wood siding and trims
 - .13 Cedar roof shingle repairs.
 - .1 Note: Owner will provide cedar shingles.
 - .14 Assessment of existing electrical panel box and electrical feed source
 - .15 Supply and install electrical wiring and accessories
 - .16 Supply and install electric light fixtures

1.2 **RESTORATION WORKSOP**

- .1 To ensure preservation of authentic historic craftsmanship, Parks Canada has established a procedure to measure and implement quality control and quality assurance on the final product.
- .2 Parks Canada's Built Heritage Restoration Services Coordinator will be hosting a Restoration Workshop onsite during the first week of construction. The primary focus of the Restoration Workshop specialist will be to provide guidance and assistance in the proper execution of the methods used during this heritage period.
- .3 The Restoration Workshop will be centered on the project specific conditions of heavy timber joinery, historic window and door installation, and cedar roofing repair and installation. Timber materials will be provided on site which, prior to the actual shoring and demolition of the building's framework, will be used to practice the specific joinery methods that will be used in the structural re-stabilisation of the Provisions Warehouse.
- .4 All craftsmen who will be involved in this rehabilitation project are required to attend the Restoration Workshop.

1.3 CONTRACT METHOD

- .1 Project will be constructed under a single lump sum contract.

1.4 PROJECT PHASING

- .1 Project is to be completed in one phase.

1.5 PROJECT INFORMATION

- .1 Project Identification: Hopedale Mission Provisions Warehouse
 - .1 Project Location: Hopedale Mission National Historic Site, Hopedale, Labrador
- .2 Department: Parks Canada, Government of Canada

1.6 FAMILIARIZATION WITH SITE

- .1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.
- .2 Obtain prior permission from the Departmental Representative before carrying out reviews and verification.

1.7 COORDINATION WITH OTHERS

- .1 Owner will retain the services of an archeologist who will be visiting the site at times throughout the work of this contract. Coordinate with Departmental Representative and archeologist to make areas available as required.
- .2 The Owner will provide a Restoration Workshop that Contractor must attend prior to begin of demolition and construction. Date of workshop will be provided at preconstruction meeting.

1.8 UTILIZATION OF LOCAL RESOURCES

- .1 The Owner will provide an amount of timber materials for the project. Refer to Section 06 10 00 – Rough Carpentry for timber schedules and quantities.

1.9 CODES AND STANDARDS

- .1 The Canada National Parks Act applies to this Work as the project is located within the boundaries of a National Historic Site. Contract limits must be strictly adhered to and every precaution taken to minimize environmental disruption and damage.
- .2 Perform work in accordance with the latest editions of the National Building Code of Canada (NBC), National Fire Code of Canada (NFC), and NFPA 101 Life Safety Code and NFPA 1 Fire Code, and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.
- .3 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.10 SETTING OUT WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work. Departmental Representative's inspection of work.
- .3 Supply stakes and other survey markers required for laying out work.

1.11 COST BREAKDOWN

- .1 Before submitting first monthly progress claim, submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.
- .2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.
- .3 Upon approval, cost breakdown will be used as basis for progress payment.

1.12 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda and amendments.
 - .4 Reviewed Shop Drawings.
 - .5 List of outstanding shop drawings.
 - .6 Change Orders.
 - .7 Other modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and other safety related documents.
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

1.13 PERMITS

- .1 In accordance with the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities.

1.14 COORDINATION WITH OCCUPANTS

- .1 Partial Occupancy: Owner may have partial occupancy during construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner operations. Maintain existing exits unless otherwise indicated.
 - .1 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Departmental Representative and authorities having jurisdiction.
 - .2 Provide not less than 72 hours notice to Departmental Representative of activities that will affect Owner operations.
 - .3 Any work that requires access to an area of the building or site that the Owner or public have access to must occur after Owner's regular work hours. Contractor is to ensure area is left in its original state for Owner use the next day.

1.15 ACCESS TO SITE

- .1 General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- .2 Access to Site: all access to the site, including delivery of materials, is through the Main gate.
- .3 Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
- .4 Condition of Existing Building: Maintain portions of the existing building affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations.

1.16 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- .3 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work.

1.17 ROUGHING-IN

- .1 Be responsible for obtaining manufacturer's literature and for correct roughing-in and hook-up of equipment, fixtures and appliances.

1.18 CUTTING, FITTING AND PATCHING

- .1 Refer to Section 01 73 29 Cutting and Patching.

1.19 CONCEALMENT

- .1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.20 LOCATION OF FIXTURES

- .1 Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.21 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian, vehicular traffic and tenant operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to Owner's operational areas. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.22 BILINGUAL NOTATIONS

- .1 Any items supplied and installed under this contract which have operating instructions on them such as mechanical and electrical equipment must have such operating instructions in bilingual format - English and French.
- .2 Factory embossed or recessed symbols illustrating equipment operation is an acceptable alternate to lettering.
- .3 Items supplied with factory - embossed or recessed lettering in one official language with an applied sticker or decal representing the second official language is not acceptable unless gives prior approval before any such items are ordered.

- .4 No extra costs will be paid for re-stocking or re-ordering of materials and equipment due to Contractor's failure to fully meet bilingual signage requirements specified herein.
- .5 Ensure that all trades are made aware of above requirements.

1.23 RELICS AND ANTIQUITIES

- .1 Accidental finds Protocol: If a cultural resource or artifact is encountered during the course of any work within the overall project, the consultant or PCA Project Manager shall immediately cease their work in the area of the discovery, record the find to the best of their ability (digital photographs, GPS location coordinates, and notes) and report the find to the Parks Canada Terrestrial Archaeology Representative immediately. The contractor shall only resume activity when permitted to proceed with the authorization of Parks Canada.
- .2 Protect relics, antiquities, items of historical or scientific interest such as cornerstones, inscribed tablets and similar objects found during the course of the Work.
- .3 Give immediate notice to the Departmental Representative and wait for Departmental Representative's written instructions before proceeding with work in this area.
- .4 Relics, antiquities and items of historical or scientific interest remain the property of the Crown.

1.24 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

- .1 Upon award of contract and prior to commencement of work, submit to Departmental Representative the following work management documents:
 - .1 Work Schedule as specified herein.
 - .2 Shop Drawing Submittal Schedule
 - .3 Waste Management Plan.
 - .4 Health and Safety Plan.
 - .5 Hot Work Procedures.
 - .6 Lockout Procedures.
 - .7 Dust Control Plan.
 - .8 List of workers requiring security clearance and those to be placed on Site Security Control list.

1.2 WORK SCHEDULE

- .1 Upon acceptance of bid submit:
 - .1 Detailed work schedule submitted within seven (7) calendar days.
- .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
- .3 Provide sufficient details in detailed schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .4 Detailed work schedule content to include as a minimum the following:
 - .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
 - .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
 - .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .5 Schedule work in cooperation with the Departmental Representative. Incorporate within Detailed Work Schedule, items identified by Departmental Representative during review of preliminary schedule.
- .6 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .7 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.

- .8 Schedule Updates:
 - .1 Submit on a monthly basis.
 - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
 - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
- .9 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .10 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 OPERATIONAL RESTRICTIONS

- .1 Safety Signage:
 - .1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility.
 - .2 Signage to be professionally printed and mounted on wooden backing, coloured and to express messages as directed by the Departmental Representative.
 - .3 Generally maximum size of sign should be in the order of 1.0 square metres.
 - .4 Include costs for the supply and installation of these signs in the bid price.
- .2 Dust and Dirt Control:
 - .1 See Section 01 50 00 Temporary Facilities and Controls and Section 01 74 11 - Cleaning for dust control and cleaning requirements.
 - .2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Departmental Representative before undertaking work, especially for major dust generating activities.
 - .3 Do not allow demolition debris and construction waste to accumulate on site and contribute to the propagation of dust.
 - .4 As work progresses, maintain construction areas in a tidy condition at all times. Remove gross dust accumulations by cleaning and vacuuming immediately following the completion of any major dust generating activity.
 - .5 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.
- .3 Ensure that all sub-trades are made aware of and abide by the contents of this section.

1.4 WORK COORDINATION

- .1 The General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.

- .1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.
- .2 The General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.
 - .1 Provide each trade with the plans and specifications of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when deemed required illustrating potential interference between works of various trades and distribute to all affected parties including structural trade.
 - .1 Coordination drawings to identify all building elements, service lines, rough-in points and indicate from where various services are coming.
 - .3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.
 - .4 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.
- .4 Work Cooperation:
 - .1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.
- .5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at own cost.

PART 1 MATERIALS

1.1 NOT USED

PART 2 EXECUTION

2.1 NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **ADMINISTRATIVE**

- .1 Contractor will schedule project meetings, on a minimum bi-weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative and Consultant.
 - .1 Contractor to ensure attendance of all subcontractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants.
 - .1 Make revisions as directed by Departmental Representative.
- .8 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 seven (7) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 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 14 10 - Scheduling and Management of Work
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 50 00 - Temporary Facilities and Controls.
 - .5 Delivery schedule of specified equipment.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Owner provided products.
 - .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .9 Maintenance manuals in accordance with Section 01 78 00 Closeout Submittals.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and prior to project completion, schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.

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 GENERAL

- .1 Section includes administrative and procedural requirements for the following:
 - .1 Pre-construction photographs.
 - .2 Photographs during construction.
 - .3 Photographs of new windows and doors

1.2 RELATED DOCUMENTS

- .1 Division 01 – General Requirements
- .2 Section 02 41 19 – Selective Structure Demolition
- .3 Section 08 14 00 - New Wood Doors and Frames
- .4 Section 08 62 13 - New Wood Window Sashes and Frames
- .5 Section 08 78 13 - Forged Hardware

1.3 INFORMATIONAL SUBMITTALS

- .1 Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Include same information as corresponding photographic documentation.
- .2 Digital Photographs: Submit claims image files taken within three (3) days of submission.
 - .1 Submit photos on CD-ROM. Include copy of key plan indicating each photograph's location and direction.
 - .2 Identification: Provide the following information with each image description in file metadata tag:
 - .1 Name of Project.
 - .2 Name and contact information for photographer.
 - .3 Name of General Contractor.
 - .4 Name of Contractor.
 - .5 Date photograph was taken.
 - .6 Description of location, vantage point, and direction.
 - .7 Unique sequential identifier keyed to accompanying key plan.
- .3 Printed Photographs: Submit with progress claim three (3) sets of prints of each photographic view taken within seven (7) days of submission.
 - .1 Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte prints on single-weight, paper; enclosed back to back in clear plastic sleeves punched for three-

ring binder. Include copy of key plan indicating each photograph's location and direction. Provide one binder for each set of prints.

- .2 Identification: On back of each print, label with the following information:
 - .1 Name of Project.
 - .2 Name and contact information for photographer.
 - .3 Name of General Contractor.
 - .4 Name of Contractor.
 - .5 Date photograph was taken if not date stamped by camera.
 - .6 Description of vantage point, indicating location, direction (by compass point), and area of roof.
 - .7 Unique sequential identifier keyed to accompanying key plan.

1.4 FORMATS AND MEDIA

- .1 Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- .2 Vibration-reduction technology in "Digital Video Recordings" Paragraph below makes more stable images and is available in some cameras.
- .3 Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software. Each photograph will illustrate the subject in the proper context of its procedure or process.
- .4 Metadata: Record accurate date and time and GPS location data from camera.
- .5 File Names: Name media files with date and Project name and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

- .1 See the Evaluations for other methods of assigning responsibility in "Photographer" Paragraph below.
- .2 Photographer: Engage a qualified photographer to take construction photographs.
- .3 General: Take photographs with maximum depth of field and in focus.
 - .1 Maintain key plan with each set of construction photographs that identifies each photographic location.
- .4 Pre-construction Photographs: Before commencement of demolition, take photographs of Project site and building, including existing items to remain during construction, from different vantage points, as directed by Departmental Representative.
 - .1 Take eight (8) photographs to show existing conditions of windows and doors.

- .5 Final Completion Construction Photographs: Take eight (8) photographs after date of Substantial Completion for submission as Project Record Documents. Departmental Representative will advise photographer of desired vantage points.
- .6 Additional Photographs will be taken by Departmental Representative as required.

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 **DEFINITIONS**

- .1 Action Submittals: Written and graphic information and physical samples that require Departmental Representative's responsive action. Action submittals are those submittals indicated in individual Specification Sections as *action submittals*.
- .2 Informational Submittals: Written and graphic information and physical samples that do not require Departmental Representative's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as *informational submittals*.
- .3 Portable Document Format (PDF): a digital file format licensed by Adobe and other software developers and used to display and print information in a consistent format regardless of computer operating system, monitor, or printer.
- .4 Days: Days of the week, excluding Saturday, Sunday, and any statutory holidays.

1.2 **ACTION SUBMITTALS**

- .1 Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Departmental Representative and additional time for handling and reviewing submittals required by those corrections.
 - .1 Coordinate submittal schedule with list of subcontracts, and Contractor's construction schedule.
 - .2 Submit Submittal Schedule concurrently with the first complete submittal of Contractor's construction schedule.
 - .3 Format: Arrange the following information in a tabular format:
 - .1 Scheduled date for first submittal.
 - .2 Specification Section number and title.
 - .3 Submittal category: Action; informational.
 - .4 Name of subcontractor.
 - .5 Description of the Work covered.
 - .6 Scheduled date for Departmental Representative's final release.
 - .7 Scheduled date of fabrication.

1.3 **SUBMITTAL ADMINISTRATIVE REQUIREMENTS**

- .1 Digital Data Files: Electronic CAD files of the Contract Drawings are available upon request from the Departmental Representative for the Contractor's use in preparing submittals.
 - .1 Departmental Representative makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

- .2 Digital Format: Files will be provided in the format generated by the drawing software used to produce the drawing.
- .2 Coordination: Coordinate preparation and processing of submittals with the performance of the construction activities.
 - .1 Coordinate each submittal to accommodate time required for fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - .2 Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - .3 Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - .4 Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - .5 Departmental Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- .3 Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Departmental Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - .1 Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Departmental Representative will advise Contractor when a submittal being processed must be delayed for coordination.
 - .2 Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - .3 Resubmittal Review: Allow 15 days for review of each resubmittal.
- .4 Electronic Submittals: Place a permanent label or title block on each submittal item for identification.
 - .1 Indicate name of firm or entity that prepared each submittal on label or title block.
 - .2 Include the following information for processing and recording action taken:
 - .1 Project name.
 - .2 Date.
 - .3 Name of Contractor.
 - .4 Name of subcontractor.
 - .5 Name of supplier.
 - .6 Submittal number or other unique identifier, including revision identifier.
 - .1 Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - .7 Number and title of appropriate Specification Section.

- .8 Drawing number and detail references, as appropriate.
 - .9 Location(s) where product is to be installed, as appropriate.
 - .10 Other necessary identification.
- .5 Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Departmental Representative may discard submittals received from sources other than Contractor.
- .1 Transmittal Form for Submittals: Provide locations on form for the following information:
- .1 Project name.
 - .2 Date.
 - .3 Name of Contractor.
 - .4 Names of subcontractor, manufacturer, and supplier.
 - .5 Category and type of submittal: action or informational as indicated in the applicable Specification Section.
 - .6 Specification Section number and title.
 - .7 Specification paragraph number or drawing designation and generic name for each of multiple items.
 - .8 Drawing number and detail references, as appropriate.
 - .9 Indication of full or partial submittal.
 - .10 Transmittal number, if applicable
 - .11 Submittal and transmittal distribution record.
 - .12 Remarks.
 - .13 Signature of transmitter.
- .6 Options: Identify options requiring selection by Departmental Representative.
- .7 Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Departmental Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- .8 Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- .1 Note date and content of previous submittal.
 - .2 Note date and content of revision in label or title block and clearly indicate extent of revision.
 - .3 Resubmit submittals until they are marked with approval notation from Departmental Representative's action stamp.
- .9 Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- .10 Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Departmental Representative's action stamp.

PART 2 **PRODUCTS**

2.1 **SUBMITTAL PROCEDURES**

- .1 General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - .1 Action Submittals: Submit electronic copy of each submittal unless otherwise indicated.
 - .2 Informational Submittals: Submit electronic copy of each submittal unless otherwise indicated. Departmental Representative will not return copies.
 - .1 Return of Action Submittals: Departmental Representative will return a PDF of a reviewed Submittal via online Construction Contract Administration service. No paper copies will be returned.
- .2 Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - .1 If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - .2 Mark each copy of each submittal to show which products and options are applicable.
 - .3 Include the following information, as applicable:
 - .1 Manufacturer's catalogue cuts.
 - .2 Manufacturer's product specifications.
 - .3 Standard colour charts.
 - .4 Statement of compliance with specified referenced standards.
 - .5 Testing by recognized testing agency.
 - .6 Application of testing agency labels and seals.
 - .7 Notation of coordination requirements.
 - .8 Availability and delivery time information.
 - .4 Submit Product Data before or concurrent with Samples.
- .3 Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - .1 Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - .1 Identification of products.
 - .2 Schedules.
 - .3 Compliance with specified standards.
 - .4 Notation of coordination requirements.
 - .5 Notation of dimensions established by field measurement.
 - .6 Relationship and attachment to adjoining construction clearly indicated.
 - .7 Seal and signature of professional engineer if specified.

- .2 Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets no larger than 11 x 17 in size.
- .1 Samples: Submit Samples for review of kind, colour, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - .1 Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - .2 Identification: Attach label on unexposed side of Samples that includes the following:
 - .1 Generic description of Sample.
 - .2 Product name and name of manufacturer.
 - .3 Sample source.
 - .4 Number and title of applicable Specification Section.
 - .5 Specification paragraph number and generic name of each item.
 - .3 Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - .1 Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - .2 Samples not incorporated into the Work, or otherwise designated as Canada's property, are the property of Contractor.
 - .4 Samples for Initial Selection: Submit manufacturer's colour charts consisting of units or sections of units showing the full range of colours, textures, and patterns available.
 - .1 Number of Samples: Submit one full set(s) of available choices where colour, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Departmental Representative will return submittal with options selected.
 - .5 Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of colour and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing colour, texture, and pattern; colour range sets; and components used for independent testing and inspection.
 - .1 Number of Samples: Submit two sets of Samples. Departmental Representative will retain one Sample set; remainder will be returned.
 - .2 Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - .3 If variation in colour, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

- .4 Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - .1 Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - .2 Manufacturer and product name, and model number if applicable.
 - .3 Number and name of room or space.
 - .4 Location within room or space.
- .5 Coordination Drawing Submittals: Comply with requirements specified in Section 01 14 10 Scheduling and Management of Work.
- .6 Contractor's Construction Schedule: Comply with requirements specified in Section 01 14 1 Scheduling and Management of Work.
- .7 Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 45 00 Testing and Quality Control.
- .8 Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 Closeout Procedures.
- .9 Maintenance Data: Comply with requirements specified in Section 01 78 00 Closeout Submittals.
- .2 Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record. Include names of firms and personnel certified.
- .10 Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- .11 Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- .12 Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- .13 Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- .14 Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- .15 Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- .16 Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - .1 Name of evaluation organization.

- .2 Date of evaluation.
- .3 Time period when report is in effect.
- .4 Product and manufacturers' names.
- .5 Description of product.
- .6 Test procedures and results.
- .7 Limitations of use.
- .17 Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- .18 Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- .19 Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- .20 Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- .1 Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - .1 Submittals shall bear the seal and signature of the Contractor's design professional licensed in the jurisdiction of the project.
 - .2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Departmental Representative.

PART 3 EXECUTION

3.1 CONTRACTOR'S REVIEW

- .1 Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Departmental Representative.
- .2 Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 Closeout Procedures.
- .3 Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of

reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DEPARTMENTAL REPRESENTATIVE'S ACTION

- .1 Action Submittals: Departmental Representative will review each submittal, make marks to indicate corrections or revisions required, and return it. Departmental Representative will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- .2 Informational Submittals: Departmental Representative will review each submittal and will not return it, or will return it if it does not comply with requirements.
- .3 Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Departmental Representative.
- .4 Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- .5 Submittals not required by the Contract Documents may be returned by the Departmental Representative without action.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2 Competent Person: means a person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .4 PPE: personal protective equipment.
- .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
 - .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
 - .5 Submit revisions and updates made to the Plan during the course of Work.
- .3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit building permit, compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

- .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit copies of incident reports.
- .8 Submit WHMIS Material Safety Data Sheets (MSDS) .

1.3 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.
- .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations as well as any other regulations made pursuant to the Act.
 - .1 The Canada Labour Code can be viewed at:
[www.http://laws-lois.justice.gc.ca/eng/acts/L-2_fulltext.html](http://laws-lois.justice.gc.ca/eng/acts/L-2_fulltext.html).
 - .2 Canadian Occupational Health and Safety Regulations can be viewed at:
<http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/index.html>.
 - .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: 819-956-4800 or 1-800-635-7943 Publication No. L31-85/2000 (E or F).
- .3 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010
www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.
- .4 Canadian Standards Association (CSA):
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .5 Observe construction safety measures of:
 - .1 NBC latest edition, Division B, Part 8.
 - .2 Municipal by-laws and ordinances.
- .6 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .7 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .8 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.4 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.5 SITE CONTROL AND ACCESS

- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 Departmental Representative will provide names of those persons authorized by Owner to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
- .2 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 Temporary Facilities and Controls for minimum acceptable requirements.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.

1.6 PROTECTION

- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
- .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.7 FILING OF NOTICE

- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
 - .1 Departmental Representative will assist in locating address if needed.

1.8 PERMITS

- .1 Post permits, licenses and compliance certificates, specified in Section 01 10 10 General Instructions, at Work Site.
- .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.9 HAZARD ASSESSMENTS

- .1 Perform site specific health and safety hazard assessment of the Work and its site.
- .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Keep documentation on site for entire duration of the Work.

1.10 PROJECT/SITE CONDITIONS

- .1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
 - .1 Existing hazardous and controlled products stored on site:
 - .1 No known products.
 - .2 Existing hazardous substances or contaminated building materials:
 - .1 No known products.
 - .3 Known latent site and environmental conditions:
 - .1 No known site and environmental conditions
- .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
- .3 Include above items in the hazard assessment of the Work.
- .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.11 MEETINGS

- .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Designated Health & Safety Site Representative.
 - .3 Subcontractors.
- .2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
- .3 Keep documents on site.

1.12 HEALTH AND SAFETY PLAN

- .1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Health and Safety Plan shall include the following components:
 - .1 List of health risks and safety hazards identified by hazard assessment.
 - .2 Control measures used to mitigate risks and hazards identified.

- .3 On-site Contingency and Emergency Response Plan as specified below.
- .4 On-site Communication Plan as specified below.
- .5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
- .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
- .3 On-site Contingency and Emergency Response Plan shall include:
 - .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
 - .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
 - .4 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.
- .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.
- .5 Address all activities of the Work including those of subcontractors.
- .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
- .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
- .8 Post copy of the Plan, and updates, prominently on Work Site.

1.13 SAFETY SUPERVISION

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work

- .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
- .3 Conduct site safety orientation session to persons granted access to Work Site.
- .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
- .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.
 - .2 Follow-up and ensure corrective measures are taken.
- .6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.
- .7 Keep inspection reports and supervision related documentation on site.

1.14 TRAINING

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .3 When unforeseen or peculiar safety-related 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 Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.15 MINIMUM SITE SAFETY RULES

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
- .2 Brief persons of disciplinary protocols to be taken for non-compliance. Post rules on site.

1.16 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 will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 INCIDENT REPORTING

- .1 Investigate and report the following incidents to Departmental Representative:
 - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
 - .2 Medical aid injuries.
 - .3 Property damage in excess of \$10,000.00,
 - .4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of \$5,000.00.
- .2 Submit report in writing.

1.18 HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .2 Keep MSDS data sheets for all products delivered to site.
 - .1 Post on site.
 - .2 Submit copy to Departmental Representative.
 - .3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.19 POWDER ACTUATED DEVICES

- .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

1.20 CONFINED SPACES

- .1 Abide by occupational health and safety regulations regarding work in confined spaces.

1.21 SITE RECORDS

- .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
- .2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.22 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

- .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan.
 - .2 WHMIS data sheets.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DEFINITIONS

- .1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally, and/or historically.
- .3 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 FIRES

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

1.4 HAZARDOUS MATERIAL HANDLING

- .1 Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment
- .2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
- .3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began.
- .4 Store and handle flammable and combustible materials in accordance with National Fire Code.
- .5 Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

1.5 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in Section 01 74 21 Construction/Demolition Waste Management and Disposal.
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

1.6 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .4 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

1.7 SITE AND PLANT PROTECTION

- .1 Protect trees and plants on site where indicated by Departmental Representative.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work and storage areas, and encase with protective wood framework from grade level to height of 2 m where indicated by Departmental Representative.

1.8 POLLUTION CONTROL

- .1 Control emissions from equipment and plant to local authorities emission requirements.
- .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.
- .3 Have appropriate emergency spill response equipment and rapid clean-up kit on site located adjacent to hazardous materials storage area. Provide personal protective equipment required for clean-up.
- .4 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Federal and Provincial Department of the Environment.
 - .1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- .1 Parks Canada Agency (PCA) on behalf of the people of Canada, protects nationally significant examples of Canada's natural and cultural heritage. The Hopedale Mission National Historic Site is a complex of large, wooden buildings constructed by the Moravian Church at Hopedale, Labrador. In 1983 the National historic site designation was expanded to include the Hopedale Mission Complex. The Provisions Warehouse was recently evaluated by the Federal Heritage Buildings Review Office (FHBRO) and recommended for designation as a recognized federal heritage building. Hopedale is the legislative capital of the Nunatsiavut Government and continues to play an important role by being at the center of decisions that affect the future of Nunatsiavut.
- .2 To ensure preservation in historic craftsmanship, Parks Canada has established a procedure to measure and implement quality control and quality assurance on the final product. PCA will request documentation and photographic evidence of the procedures and processes undertaken by the contractor during construction of the below elements, which reference instructions outlined in the project specification.
- .3 Under the scope of this criteria, provide photographic evidence specific to the following. Refer to Section 01 32 33 – Photographic Documentation for additional information about the submission of photographs. Approval must be obtained prior to continuation of construction activity:
 - .1 Section 08 03 80 - Historic Glazing
 - .1 Provide photographic evidence of the following:
 - .1 Linseed oil putty glazing compound is used
 - .2 Before applying glazing putty, glazing rebates are primed with a mixture of shellac flakes and alcohol
 - .3 The shellac mixture is brushed into all rebates
 - .2 Section 08 14 00 - New Wood Doors and Frames
 - .1 Provide photographic evidence of the following:
 - .1 Tongue and groove edges are primed with one coat of linseed oil and one coat of linseed oil paint, (prior to assembly)
 - .3 Section 08 62 13 - New Wood Window Sashes and Frames
 - .1 Provide photographic evidence of the following:
 - .1 Top rail and stile single through mortise and tenon are wedged, draw-bore pegged
 - .2 Bottom rail and stile through single mortise and tenon wedged, draw-bore pegged
 - .3 Vertical muntin bars are continuous and wedged, draw-bore pegged
 - .4 Section 08 78 13 - Forged Hardware
 - .1 Provide photographic evidence of the following:
 - .1 Forge welding done in the fire. (Gas or electric welding is not permitted).

- .2 Samples of project work using traditional techniques of drawing out, upsetting, forge welding, riveting, etc.
- .3 Complete hardware installation on one door for review (prior to completing remainder).
- .5 Section 09 91 00 - Painting for Wood Work - Historic
 - .1 Provide photographic evidence of the following:
 - .1 Linseed oil paint, by same manufacturer as putty compound
 - .2 Traditional dark pine tar made by burning resin out of pine tree stumps
 - .3 One coat of boiled linseed oil, applied warm onto warm surface, on new wood
 - .4 All hidden surfaces, especially end grain, of all components primed with one coat of boiled linseed oil, applied warm onto warmed surface.
 - .5 Two coats of dark pine tar mixed 1:1 with boiled linseed oil, applied warm to warmed surfaces, on the outside of all window and door frames, including jambs, head and sill (paying particular attention to construction joints and end grains).
 - .6 All end grains at mortise and tenons for new sash and door joinery primed with one coat of boiled linseed oil, applied warm onto warmed surface.
 - .7 A slurry, made by mixing boiled linseed oil and glazing putty, rubbed into the end grain of new sash and door joinery
 - .8 Two coats of dark pine tar on all window and door frame surfaces which are not being painted. Pine tar worked into end grain and construction joints.

1.2 INSPECTION

- .1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.
- .2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- .3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.
- .4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.3 TESTING

- .1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
 - .1 Provide all necessary instruments, equipment and qualified personnel to perform tests.

- .2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00 Submittal Procedures.
 - .1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00 Closeout Submittals.
- .3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.
- .4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Departmental Representative may engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and other building systems.
 - .4 Performance verification tests before building commissioning procedures commences.
 - .5 Mill tests and certificates of compliance.
 - .6 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.
 - .7 Additional tests as deemed necessary by Departmental Representative.
- .2 Provide sufficient advance notice to Departmental Representative of time when the Work will be ready for testing by designated Testing Agency in order for Departmental Representative to make attendance arrangements with such Agency. When directed by Departmental Representative notify the Agency directly.
- .3 When specified or directed, submit Representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .4 Provide labour and facilities to obtain, handle and deliver samples.
- .5 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.
- .6 Employment of Independent Inspection and Testing Agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

1.5 ACCESS TO WORK

- .1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

- .2 Furnish labour and facility to provide access to the work being inspected and tested.
- .3 Co-operate to facilitate such inspections and tests.

1.6 REJECTED WORK

- .1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.
- .2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

1.7 MOCK-UPS

- .1 Prepare mock-ups of work as specified in various sections of the Specifications. Include in each mock-up all related work components representative of final assembly.
- .2 Construct in locations acceptable to Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an 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 a schedule fixing dates for preparation.
- .6 Dismantle and remove mock-up when directed by Departmental Representative, unless approval is given for mock-up to remain as part of the Work.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 SITE ACCESS AND PARKING

- .1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.
- .2 Vehicular traffic and staging areas will be restricted to present-day roadways and disturbed areas.
- .3 Maintain existing roads and parking areas at site, where used by Contractor, for duration of contract.
 - .1 Keep clean and free of mud and dirt by washing on a regular basis.
 - .2 Provide snow removal in areas located within construction site or enclosed by work.
 - .3 Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.

1.2 CONTRACTOR'S SITE OFFICE

- .1 Departmental Representative will coordinate an area designated as site office and will advise of location at pre-construction meeting.

1.3 MATERIAL STORAGE

- .1 Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with existing Facility operations.

1.4 SITE ENCLOSURES

- .1 Provide temporary fence to enclose area of work site if requested by Departmental Representative.
- .2 Erect wood fence to 2400 mm height, constructed as follows:
 - .1 Use 38 x 89 mm construction grade framing spaced at maximum 600 mm oc covered with 13 mm thick exterior grade fir plywood on public side and adequately braced.
 - .2 Apply plywood panels vertically with flush and butted joints.
 - .3 Provide one truck gate and at least one pedestrian door as directed by Departmental Representative.
 - .4 Paint public side of site enclosure in selected colours with one coat primer to CGSB 1-GP-55e and one coat exterior paint to CGSB 1-GP-59M.
 - .5 Maintain public side of enclosure in clean condition.
- .3 Make all gates lockable and provide keyed padlocks.
- .4 Obtain Departmental Representative's approval beforehand of location and layout of all temporary fence enclosures.
- .5 Provide battery powered lanterns around the perimeter of the site enclosure to clearly mark its location at night.

- .6 Provide warning signs affixed to all fenced areas, identifying those enclosed areas as "Construction Zones" with access restricted to only those persons so authorized by General Contractor.
- .7 Do not construe fencing as an acceptable replacement for pedestrian walkway and hoarding requirements specified below.

1.5 PEDESTRIAN WALKWAYS AND HOARDING

- .1 Be responsible for and provide temporary 2.4 metre high plywood construction hoarding when work is adjacent to exterior sidewalks.
- .2 Maintain access and egress to building entrances and fire exits.
- .3 Adequately frame and brace hoarding and walkways to resist wind, and other weather or site conditions.
- .4 Erect such protective devices during Facility's non-operational off hour periods.
- .5 Obtain Departmental Representative's concurrence prior to removal of hoarding and walkways.

1.6 SANITARY FACILITIES

- .1 Departmental Representative will coordinate sanitary facilities and advise of location at pre-construction meeting.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.7 ENCLOSURE OF STRUCTURE

- .1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.
- .2 Provide weathertight and heated enclosures to conduct exterior work during winter and other inclement weather conditions. Erect to allow accessibility for installation of materials and working inside of enclosure.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.8 POWER

- .1 Departmental Representative will coordinate power supply and advise at pre-construction meeting.

1.9 WATER SUPPLY

- .1 Departmental Representative will coordinate water supply and advise at pre-construction meeting.

1.10 SCAFFOLDING AND FALSEWORK

- .1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797-09 (R2014) Code of Practice for Access Scaffold and CSA S169.2-16 Access Scaffolding for Construction Purposes.
- .2 Erect scaffolding independent of walls. Remove when no longer required.

- .3 Design, construct and maintain falsework in accordance with CSA S269.1-16 Falsework and Formwork.

1.11 HEATING AND VENTILATING

- .1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.
- .2 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of work.
 - .2 Protect work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.
 - .1 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
- .4 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours, or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .6 Submit bid assuming existing or new equipment and systems will not be used for temporary heating and ventilating.
- .7 Upon acceptance of bid, Departmental Representative may permit use of permanent system providing agreement can be reached on:

- .1 Conditions of use, special equipment, protection and maintenance.
- .2 Saving on Contract price.
- .3 Provisions relating to warranties on equipment.

1.12 CONSTRUCTION SIGN AND NOTICES

- .1 Upon request by Departmental Representative, erect a self-supporting project sign in location indicated.
- .2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in size complete with required wood framing at 400 mm o.c and support posts.
- .3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.
- .4 Contractor or subcontractor advertisement signboards are not permitted on site.
- .5 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321-96(R2006).
- .6 Maintenance and Disposal of Site Signs:
 - .1 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

1.13 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Departmental Representative.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

- .1 Use new material and equipment unless otherwise specified.
- .2 Within seven (7) days of written request by Owner, submit following information for any materials and products proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Compliance to specified standards.
 - .5 Manufacturer's installation or application instructions.
 - .6 Evidence of arrangements to procure.
 - .7 Evidence of manufacturer delivery problems or unforeseen delays.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.2 PRODUCT QUALITY

- .1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2 Final decision as to whether a product or system meets contract requirements rest solely with the Owner in accordance with the General Conditions of the Contract.

1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

- .1 Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.
- .2 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURERS INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Owner in writing of any conflict between these specifications and manufacturer's instructions, so that Owner will designate which document is to be followed.

1.5 AVAILABILITY

- .1 Immediately notify Owner in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.1.2 above.

1.6 WORKMANSHIP

- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.
- .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
- .4 Coordinate work between trades and subcontractors. See Section 01 14 10 Scheduling and Management of Work in this regard.
- .5 Coordinate placement of openings, sleeves and accessories.

1.7 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.
- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.
- .3 Keep exposed fastenings to minimum, space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.
- .5 Do not use explosive actuated fastening devices unless approved by Owner. See section on Health and Safety Requirements in this regard.

1.8 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

1.9 STORAGE, HANDLING AND PROTECTION

- .1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

- .6 Immediately remove damaged or rejected materials from site.
- .7 Touch-up damaged factory finished surfaces to Owner's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **ACTION AND INFORMATIONAL 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 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 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 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

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 DEFINITIONS

- .1 Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- .2 Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.2 QUALITY ASSURANCE

- .1 Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- .2 Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - .1 Primary operational systems and equipment.
 - .2 Air or smoke barriers.
 - .3 Fire-suppression systems.
 - .4 Mechanical systems piping and ducts.
 - .5 Control systems.
 - .6 Communication systems.
 - .7 Conveying systems.
 - .8 Electrical wiring systems.
- .3 Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 - .1 Water, moisture, or vapour barriers.
 - .2 Membranes and flashings.
 - .3 Equipment supports.
 - .4 Piping, ductwork, vessels, and equipment.
 - .5 Noise- and vibration-control elements and systems.
- .4 Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Departmental Representative's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.3 WARRANTY

- .1 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 General: Comply with requirements specified in other Sections.
- .2 In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - .1 If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - .1 Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - .2 Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Temporary Support: Provide temporary support of Work to be cut.
- .2 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- .3 Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- .4 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- .1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - .1 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .2 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size

- required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - .3 Concrete and masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - .4 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - .5 Proceed with patching after construction operations requiring cutting are complete.
- .3 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
- .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - .1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - .2 Restore damaged pipe covering to its original condition.
 - .3 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.
- .4 Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

PART 1 **GENERAL**

1.1 **GENERAL**

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 **MATERIALS**

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 **CLEANING DURING CONSTRUCTION**

- .1 Maintain work site in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
- .2 Keep building entrances and exterior walkways in a clean and dust free condition at all times. Conduct thorough cleaning of these areas when used by workers or affected by the Work.
- .3 Provide on-site dump type and recycling containers for collection of waste materials and debris.
- .4 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.
- .5 Remove waste materials, and debris from site on a minimum weekly basis.
- .6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .7 Provide dust barriers, dividers, seals on doors and employ other dust control measures as required to ensure that dust and dirt, generated by work, are not transmitted to existing areas of building. Should dust migrate into the building, employ such means as may be necessary to immediately clean all contaminated surfaces to the satisfaction of the Departmental Representative.
- .1 See Section 01 50 00 Temporary Facilities and Controls for requirements on dust control and for erection of dust partitions.

1.4 **FINAL CLEANING**

- .1 In preparation for acceptance of the completed work perform final cleaning.
- .2 Replace items with broken pieces, scratches or disfigured.
- .3 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.
- .4 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.

- .5 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds that have been affected by the Work.
- .6 Remove debris and surplus materials from roof areas and other accessible concealed spaces.

PART 2 **MATERIALS**

2.1 **NOT USED**

PART 3 **EXECUTION**

3.1 **NOT USED**

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

- .1 Hazardous Material: Product, substance, or organism that is used for its original purpose, and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

1.2 WASTE MANAGEMENT

- .1 Incorporate environmental and sustainable practices in managing waste resulting from work.
- .2 Divert as much waste as possible from landfill.
- .3 Coordinate work of subtrades and subcontractors to ensure all possible waste reduction and recycling opportunities are taken. Follow waste management requirements specified in trade sections of the Specifications.
- .4 Reduce waste during installation of new materials. Undertake practices which will optimize full use of materials and minimize waste.
- .5 Develop innovative procedures to reduce quantity of waste generated by construction such as by delivering materials to site with minimal packaging etc.
- .6 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
- .7 During demolition and removal work separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
 - .1 Reinstallation into the work where indicated.
 - .2 Salvaging reusable items not needed in project which Contractor may sell to other parties.
 - .3 Sending as many items as possible to locally available recycling facility.
 - .4 Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.
- .8 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
- .9 Send leftover material resulting from installation work for recycling whenever possible.
- .10 Establish methods whereby hazardous and toxic materials and their containers used on site are properly handled, stored and disposed in accordance with applicable federal, provincial and municipal laws and regulations.

1.3 DISPOSAL REQUIREMENTS

- .1 Burying or burning of rubbish and waste materials is prohibited.
- .2 Disposal of volatile materials, mineral spirits, oil, paint, and other hazardous materials into waterways, storm, or sanitary sewers is prohibited.

- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.
- .5 Transport and dispose of waste intended for waste processing plant or landfill facility in separated condition and to Operator's rules and recommendations in support of their effort to recycle, reduce and divert certain waste stream from general landfill.
- .6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
 - .1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.
- .2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.
 - .1 Address defects, faults and outstanding items of work identified by such inspections.
 - .2 Advise Departmental Representative when all deficiencies identified have been rectified.
- .3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
 - .1 Project record as-built documents;
 - .2 Final Operations and Maintenance manuals;
 - .3 Maintenance materials, parts and tools;
 - .4 Compliance certificates from applicable authorities;
 - .5 Reports resulting from designated tests;
 - .6 Demonstration and training complete with user manuals;
 - .7 Manufacturer's Guarantee certificates.
 - .8 Testing, adjusting and balancing of systems complete with submission of test reports.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

PART 2 MATERIALS

- .1 NOT USED

PART 3 EXECUTION

- .1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 PROJECT RECORD DOCUMENTS

- .1 Departmental Representative will provide 2 white print sets of contract drawings and 2 copies of Specifications Manual specifically for "As-Built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual As-Built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
 - .2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
 - .3 Stamp all drawings with "As-Built". Label and place Contractor's signature and date.
 - .4 Show all modifications, substitutions and deviations from what is shown on the contract drawings.
 - .5 Record following information:
 - .1 Field changes of dimension and detail;
 - .2 Location of all capped or terminated services and utilities.
 - .3 Chases for mechanical, electrical and other services;
 - .4 All design plans and details dimensioned and marked-up to consistently report finished installation conditions;
 - .5 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;
 - .6 All change orders issued over the course of the contract must be documented on the finished As-Built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
- .5 As-Built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Changes made by Addenda and Change Orders.
 - .2 Mark up both copies of specifications; stamp "As-Built", sign and date similarly to drawings as per above clause.
- .6 Maintain As-Built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis to ensure status.
- .7 Submit on paper and in electronic format as pdf files. Forward pdf and in the native program format, MS Word, AutoCAD dwg and photograph jpg files on USB

compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 REVIEWED SHOP DRAWINGS

- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.
- .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

1.3 UPDATING OF DIGITAL DRAWINGS

- .1 Obtain and pay for the services of a qualified drafting firm to update the digital files which were used to produce the contract drawings.
 - .1 Update the digital drawing files with the same As-Built information as specified for the paper As-Built drawings.
 - .2 Supply of digital documents does not replace the requirement to provide marked-up white prints specified above.
- .2 The Departmental Representative will provide a copy of the digital drawing files.
- .3 Incorporate the as-built changes to the digital drawings by following the standards specified in the latest version of the PWGSC National CADD Standard. A copy of this manual will be provided by the Departmental Representative.
- .4 Make revisions to electronic files found to be in non-conformance with the PWGSC National CADD Standard as directed by Departmental Representative.
- .5 In regards to updating the digital files to reflect changes resulting from Change Orders, the change in cost of completing the As-Built documentation of changes is to be included in the amount for each Change Order issued. The amount included will constitute only the increase or decrease in CADD related costs resulting directly from the change. In determining the cost difference, full consideration will be given to the fact that other clauses of this section require As-Built CADD updates to the drawings irrespective of any Change Orders.
- .6 Deliver the digital As-Built information in same format and sequence as the contract drawings and specifications.
 - .1 Submit on PWGSC encrypted USB.
 - .2 Provide one (1) full set of paper plots.
 - .3 Submit the digital As-Built at the same time as the marked-up paper white prints.

1.4 OPERATIONS & MAINTENANCE MANUAL

- .1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.
- .2 Manual Language: final manuals to be in English language.

- .1 Upon review and acceptance by Departmental Representative, submit 3 final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .3 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.
- .4 Binding:
 - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
 - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
 - .3 Where multiple binders are needed, correlate data into related consistent groupings.
 - .4 Identify contents of each binder on spine.
 - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
 - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
 - .7 Type lists and notes. Do not hand write.
 - .8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .5 Manual Contents:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Contractor, and all Sub-Contractors.
 - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .3 List of maintenance materials.
 - .4 List of spare parts.
 - .5 List of special tools.
 - .6 Original or certified copy of warranties and product guarantees.
 - .7 Copy of approval documents and certificates issued by Inspection Authorities.
 - .8 Copy of reports and test results performed by Contractor as specified.
 - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:
 - .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

- .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
 - .3 Parts list.
 - .4 Installation details.
 - .5 Operating instructions.
 - .6 Maintenance instructions for equipment.
 - .7 Maintenance instructions for finishes.
- .6 Shop drawings:
- .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
 - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
 - .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.
- .7 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
- .1 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 troubleshooting; disassembly, repair, and reassembly instructions.
 - .3 Manufacturer's printed operation and maintenance instructions.
 - .4 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .5 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .6 Include test reports.
 - .7 Additional requirements as specified in individual specification sections.
- .8 Materials and Finishes Maintenance Data:
- .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.

1.5 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

- .1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.
- .2 Tag all items with associated function or equipment.
- .3 Provide items of same manufacture and quality as items in Work.
- .4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.
- .5 Clearly mark as to contents indicating:
 - .1 Part number.
 - .2 Identification of equipment or system for which parts are applicable.
 - .3 Installation instructions or intended use as applicable.
 - .4 Name, address and telephone number of nearest supplier.
- .6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **DESCRIPTION**

- .1 Departmental Representative will provide a list of Owner's personnel to receive instructions.
- .2 Cooperate with Departmental Representative in coordinating time and attendance of Owner's personnel with manufacturer's training Representative(s).
- .3 Verify that all new Work is operating correctly.

1.2 **QUALITY CONTROL**

- .1 Ensure that only personnel from own forces, Subcontractors, or Suppliers competent and fully knowledgeable in the particular material component, equipment or system installation are used to provide training and demonstrations.
- .2 When specified in individual Sections, obtain the manufacturers authorized Representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.
- .3 Upon request, provide evidence to Departmental Representative of individual Trainor's knowledge and qualifications.
- .4 Provide written report verifying all new windows and doors, including hardware, are operating correctly.

1.3 **SUBMITTALS**

- .1 Submit schedule of time, date and complete list of components for which demonstration and training sessions will be provided. Submit schedule a minimum of 2 weeks prior to designated dates, for Departmental Representative approval.
- .2 Submit report within 1 week after completion of demonstration, that demonstration and instructions have been satisfactorily completed. Provide time and date of when each demonstration was actually given, with list of persons present.

1.4 **CONDITIONS FOR DEMONSTRATIONS**

- .1 Prior to carrying out demonstration and training, ensure that equipment has been inspected and tested, is fully operational, has been performance verified and TAB has been carried out.
- .2 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.5 **PREPARATION**

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.6 **DEMONSTRATION AND INSTRUCTIONS**

- .1 Include the following items within the demonstration and training:

- .1 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .2 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .3 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
- .4 Provide other specific training and instructions as specified in trade sections.

1.7 TIME ALLOCATED FOR INSTRUCTIONS

- .1 Observe the allocated time period specified in trade sections. Provide additional time when required to ensure all personnel fully understand all aspects of the information and instructions being provided. Allow for questions by participants.

PART 2 MATERIALS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Structural upgrades to be completed on a Classified Federal Heritage Building as indicated on drawings. Additional items include:
 - .1 Exterior door and window removals in preparation for replacement doors and windows.
 - .2 Temporary partial removal of existing floor boards to accommodate work. Protect and store boards and then reinstate.

1.2 DEFINITIONS

- .1 Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .4 Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

- .1 Schedule of Selective Demolition Activities: Indicate the following:
 - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Facility's building managers and other tenants' on-site operations are uninterrupted.
 - .2 Interruption of utility services. Indicate how long utility services will be interrupted.
 - .3 Coordination for shutoff, capping, and continuation of utility services.
 - .4 Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other tenants affected by selective demolition operations.
 - .5 Coordination of Facility's continuing occupancy of portions of existing building and of Facility's partial occupancy of completed Work.
 - .6 Means of protection for items to remain and items in path of waste removal from building.
- .2 Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.4 QUALITY ASSURANCE

- .1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- .2 Standards: Comply with ANSI A10.6, NFPA 241, NBCC, and NFCC.

- .3 Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Section 01 14 10 Schedule and Management of Work. Review methods and procedures related to selective demolition including, but not limited to, the following:
 - .1 Inspect and discuss condition of construction to be selectively demolished.
 - .2 Review structural load limitations of existing structure.
 - .3 Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - .4 Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - .5 Review areas where existing construction is to remain and requires protection.

1.5 PROJECT CONDITIONS

- .1 Portions of building immediately adjacent to selective demolition area will be occupied. Conduct selective demolition so Facility's operations will not be disrupted.
 - .1 Comply with requirements specified in Section 01 10 10 General Instructions.
- .2 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- .3 Notify Departmental Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- .4 Hazardous Materials: No known products.
- .5 Storage or sale of removed items or materials on-site is not permitted.
- .6 Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - .1 Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

- .1 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- .1 Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- .2 Standards: Comply with NBCC Part 8 *Safety Measures at Construction and Demolition Sites*, ANSI/ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that utilities have been disconnected and capped if required to complete work.
- .2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Departmental Representative.
- .5 Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- .1 Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - .1 Comply with requirements for existing services/systems interruptions specified in Section 01 10 10 General Instructions.

3.3 PREPARATION

- .1 Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, landscaped areas, walkways, and other adjacent occupied and used facilities.
 - .1 Comply with requirements for access and protection specified in Section 01 50 00 Temporary Facilities and Controls.
- .2 Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities.
 - .1 Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - .2 Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - .3 Protect walls that are to remain or that are exposed during selective demolition operations.
 - .4 Cover and protect equipment that has not been removed.
 - .5 Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section *Temporary Facilities and Controls*.
- .3 Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - .1 Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- .1 To limit risk of exposure, the demolition must be phased and limited in area to suit that which can be resealed within a reasonable amount of time. Contractor to have enough temporary coverings on site to cover exposed areas of work.
- .2 General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - .1 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - .2 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - .3 Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - .4 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .5 Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 21 Construction/Demolition Waste Management and Disposal.
- .3 There is a high probability of water infiltration/leaks during this project. Particular during the demo/stripping of the existing door and window components. Contractor to have all necessary materials on site to quickly respond when leaks are encountered.
- .4 Contractor is responsible for addressing all new leaks caused during this roof replacement project. This includes quickly responding to leaks (24/7) by protecting bldg. components from leaks, clean-up/replacement of water damaged items.
- .5 Contractor is responsible for all repairs to lawns, grounds or portions of the building damaged by equipment during the execution of the Work.
- .6 Contractor to advise Departmental Representative immediately if demolition reveals any existing conditions that need to be addressed before proceeding with new installations.
- .7 Do not demolish building elements beyond what is indicated on Drawings without Departmental Representative approval.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- .1 General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner 's property, remove demolished materials from Project site and legally dispose of them in an approved landfill.
 - .1 Do not allow demolished materials to accumulate on-site.
 - .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - .3 Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - .4 Comply with requirements specified in Section 01 74 21 Construction/Demolition Waste Management and Disposal.

- .2 Burning: Do not burn demolished materials.
- .3 Disposal: Transport demolished materials off Facility's property and legally dispose of them.

3.6 CLEANING

- .1 Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 CSA International
 - .1 CSA A23.1/A23.2-2014, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-2014 Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA-A3000-2016, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.2 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for mortar and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Prior to mixing or preparation of mortars submit for review to Departmental Representative confirmation of source or product data sheet of:
 - .1 Aggregate.
 - .2 Cement.
 - .3 Lime.
 - .4 Premixed products.
 - .5 Pigments.
- .3 Samples:
 - .1 Provide samples in quantity and size in accordance with CAN/CSA-A179.
- .4 Test reports:
 - .1 Submit test results during site work as directed by Departmental Representative's as follows:
 - .1 Sieve analysis: sand.
 - .2 Bulking analysis: sand.
 - .3 Air content: mortar mix in plastic state.
 - .4 Vicat cone penetration: mortar mix.
 - .5 Mortar compressive strength: at 7 and 28 days or otherwise required.

1.3 **QUALITY ASSURANCE**

- .1 Qualifications:
 - .1 Mortar to be mixed by same mechanics throughout project.
- .2 Mock-ups:

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Submit methods of reproducing existing mortar colour, texture and pointing types, and samples.
- .3 Construct mock-up 1000 x 1000 mm.
- .4 Mock-up will be used:
 - .1 To judge quality of work, substrate preparation, and material application.
 - .2 Demonstrate bond pattern and colour match.
 - .3 For testing to determine compliance with performance requirements.
- .5 Locate as directed by Departmental Representative.
- .6 Notify Departmental Representative 48 hours before commencing mock-up.
 - .1 Obtain approval from Departmental Representative before commencing mock-up.
- .7 Allow 24 hours for inspection of mock-up before proceeding with work.
- .8 When accepted, mock-up will demonstrate minimum standard for this Work. Approved mock-up will remain as part of finished work.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store cementitious materials and aggregates in accordance with CSA A23.1/A23.2.
 - .3 Store lime putty in plastic lined sealed drums.
 - .4 Protect from weather, freezing and contamination.
 - .5 Remove rejected or contaminated material from site.
 - .6 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 BRICK

- .1 General: Project requires the removal, protection, and reinstatement of the existing brick work (nogging). Source of new/additional brick, if required, to be approved by Departmental Representative.

2.2 MORTAR MATERIALS

- .1 Use type of mortar to match existing.
- .2 Portland Cement:

- .1 Type: CSA-A3000, Type II containing maximum 0.60% alkali sodium oxide and maximum 0.15% soluble alkali by weight.
- .2 Colour: To match existing
- .3 Lime: CSA-A3000, Type S, hydrated masonry type.
- .4 Sand: CSA-A3000, colour, size, and type to match existing mortar.
- .5 Water: Potable, clean, and free from deleterious amounts of acids, alkali, and organic matter.
- .6 Colouring Additive: Chemically pure mineral oxides, alkali proof and light fast.
- .7 Other Components: As determined by existing mortar analysis to produce visual and performance characteristics to match existing mortar.
- .8 Air Entraining, Antifreeze, Bonding, and Other Additives: Not permitted.
- .9 Premixed Mortar: Not permitted.

2.3 MORTAR MIXES

- .1 Proportions: As determined by existing mortar analysis.
- .2 Ultimate Compressive Strength: Not to exceed that of existing mortar or masonry.
- .3 Portland cement may be substituted for up to 20% of lime in mix.

2.4 MIXING MORTAR

- .1 Thoroughly mix ingredients in quantities needed for immediate use.
- .2 Mix dry ingredients mechanically until uniformly distributed; add water to achieve workable consistency.
- .3 Discard lumpy, caked, frozen, and hardened mixes, and mixes not used within 2 hours after initial mixing.
- .4 Use mortar within 2-1/2 hours after initial mixing at ambient temperatures below 27 degrees C and within 1-1/2 hours after initial mixing at ambient temperatures over 27 degrees C.
- .5 Do not add antifreeze compounds to lower freezing temperature of mortar.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence Departmental Representative.
 - .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Check for evidence of repairs, cracks, moisture, soluble salt contamination and other defects, and report to Departmental Representative before starting Work.

- .3 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

3.2 PREPARATION

- .1 Place safety devices near work area as directed in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Install and remove self-supporting scaffolding in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

3.3 BRICK REMOVAL

- .1 Verify locations and dimensions of areas of Work with Departmental Representative.
- .2 Identify deteriorated and salvageable bricks in areas of work Departmental Representative.
- .3 Remove identified areas of deteriorated or salvageable brickwork as follows, taking care not to damage edges or face of bricks to be salvaged:
 - .1 Cut through brickwork in lengths that will allow safe removal.
 - .2 Cut out non-load bearing brickwork in length as practicable.
 - .3 During removal, protect sound areas to remain. Use mechanical hand methods of removal. Obtain Departmental Representative's approval for use of power tools before commencing work.
 - .4 Remove adhered mortar from surface of adjacent bricks that remain in place.

3.4 BRICK SALVAGE

- .1 Carefully clean, and store bricks for re-use. Store and protect bricks in accordance with article 1.4 DELIVERY, STORAGE, AND HANDLING.
- .2 Remove deteriorated and adhered mortar from masonry surfaces to full depth of deteriorated mortar but in no case less than 20 mm leaving square corners and flat surface at back of cut.
- .3 Clean out voids and cavities encountered.
- .4 Where use of power tools to remove mortar is deemed appropriate by Departmental Representative.
 - .1 Stop saw cut 50 to 75 mm from end of vertical and discontinuous horizontal joints. Do not cut into masonry units.
 - .2 Notify Departmental Representative to inspect raking, prior to removing remaining mortar with hand tools.
 - .3 Remove remaining mortar with hand tools.
- .5 Remove mortar without chipping, altering or damaging masonry units.
- .6 Clean surfaces of joints with non-ferrous brush, moderate water wash, or by compressed air without damaging texture of exposed joints or masonry units.
- .7 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.

- .8 Leave no standing water.

3.5 BRICK REPLACEMENT

- .1 Co-ordinate bond pattern, coursing height, and joint width with existing brickwork in area selected by Departmental Representative.
- .2 Mix and blend brick units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .3 Except in cold weather, pre-wet bricks having an initial rate of absorption exceeding 30 g/minute 194 cm² to uniform degree of saturation, 3 to 4 hours before laying. Do not lay until surface is dry or damp only, with no standing water.
- .4 Clean dust and brick fragments from slot. Before proceeding with Work, inspect cleaned surface with Departmental Representative.
- .5 Thoroughly dampen slot's surfaces before applying mortar.
- .6 Apply mortar and lay bricks.
 - .1 Lay bricks on beds of mortar that extend approximately three quarter ($\frac{3}{4}$) the depth of the unit to avoid mortar coming in contact with exterior wall assembly.
 - .2 Fill vertical joints buttered and placed full in face and back-up bricks, and at vertical joint between wythes.
 - .3 Lay bricks and tool joints in one operation, tooling with a round jointing tool to provide smooth joints compressed uniformly concave.
- .7 Apply pointing mortar, in accordance with article 3.7 REPOINTING:
- .8 Finish joints to match those of existing brickwork, in area identified by Departmental Representative.
- .9 Clean finished brickwork on daily basis as work progresses, in accordance with article 3.9 CLEANING.
 - .1 Remove mortar splashings on exposed brickwork.
 - .2 Leave no mortar on face of bricks.
 - .3 Remove mortar staining before it sets.
 - .4 Clean masonry with clean water and stiff, non-ferrous bristle brush only.
- .10 Inspect finished brickwork with Departmental Representative.

3.6 REPOINTING

- .1 When removal and replacement of brick is not required, carry out repointing.
- .2 Immediately prior to pointing, thoroughly dampen joints and porous masonry units.
- .3 Allow water to soak into masonry and mortar. Leave no standing water. Ensure joint surface remains damp.
- .4 Keep masonry damp while pointing is being performed.
- .5 Completely fill joint with mortar.
 - .1 Masonry units with worn rounded edges: maintain joint width by keeping pointing 1 mm back from exterior face.

- .2 Do not feather edges.
- .3 Pack mortar solidly into voids and joints, compact firmly. Ensure positive adhesion to inner surfaces, for full depth of joint.
- .6 Build-up pointing in layers not exceeding 12 mm in depth.
 - .1 Allow each layer to set to thumb print hardness before applying subsequent layers.
 - .2 Keep mortar damp while work progresses.
 - .3 Maintain joint width.
- .7 Finish joints to match existing profile.
 - .1 Tool and compact using jointing tool or mason's slick to force mortar into joint. Ensure jointing tool fits within width of joint. Use tools of varying widths to meet this requirement.
 - .2 Provide final exposed aggregate texture when mortar has dried to thumb-print hardness with a lightly moistened sponge or by striking surface of joint with a stiff bristle brush.
- .8 Remove excess mortar from masonry face before it sets.

3.7

PROTECTION DURING CURING PROCESS

- .1 Ensure mortar does not come into contact with exterior wall sheathing by providing no more than $\frac{3}{4}$ the depth of the brick.
- .2 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
 - .1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .3 Cover with waterproof tarps to protect newly laid mortar from frost, rainfall, and rapid drying conditions such as wind.
 - .1 Maintain tarps in place for minimum of 2 weeks after repointing.
 - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .4 Anchor coverings securely in position.
- .5 Damp cure:
 - .1 Provide damp cure for back pointing and finish pointing mortars, at a minimum temperature of 5 degrees C.
 - .2 Install and maintain wetted burlap protection during the curing process, using heavy and tight-woven burlap:
 - .1 Minimum 3 days.
 - .3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
 - .4 Ensure burlap is not in contact with masonry. Leave air space of minimum 50 mm between burlap and masonry.
 - .5 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

- .6 Provide for off-hours and week-end work as required to maintain specified curing conditions.
- .6 Protect from drying winds. Pay attention at corners of structure.
- .7 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
 - .1 Minimum 7 days in summer.
 - .2 Minimum 30 days in cold weather conditions using dry heated enclosures.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Clean brick work surfaces after repairs have been completed and mortar has set.
- .3 Clean brick surfaces of adhesive or mortar residue resulting from work performed without damaging bricks or joints.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.9 PROTECTION OF COMPLETED WORK

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

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Work under this Section includes:
 - .1 Boards, dimension lumber and timber for wood frame buildings, including treated products.
 - .2 Wood blocking, nailers, rough bucks, furring for wood doors, frames and window replacements for historic building. Wood for frames and sashes specified under Section 08 14 00 - New Wood Doors and Frames and Section 08 62 13 - New Wood Window Sashes and Frames.
 - .3 Cleaning and treating of exposed wood timbers.

1.2 **RELATED REQUIREMENTS**

- .1 Division 01 - General Requirements
- .2 Section 08 14 00 - New Wood Doors and Frames
- .3 Section 08 62 13 - New Wood Window Sashes and Frames

1.3 **REFERENCES**

- .1 ASTM International
 - .1 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .2 ASTM A563M-07 (2013), Standard Specification for Carbon and Alloy Steel Nuts
 - .3 ASTM B633-15, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 - .4 ASTM C954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
 - .5 ASTM D3498-03 (2011), Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
- .2 CSA International
 - .1 CSA O80 Series-15, Wood Preservation
 - .2 CSA B111-1974 (R2003), Wire Nails, Spikes and Screws.
 - .3 CSA O121-17, Douglas Fir Plywood
 - .4 CSA O141-05 (R2014), Softwood Lumber.
 - .5 CSA O151-09 (R2014), Canadian Softwood Plywood
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2014.

1.4 **LUMBER DEFINITIONS**

- .1 Boards or Strips: Lumber of less than 50 mm nominal (38 mm actual) size in least dimension.

- .2 Dimension Lumber: Lumber of 38 mm actual or greater but less than 114 mm actual in least dimension.
- .3 Timber: Square-sawn lumber having a minimum nominal dimension of 125 mm (5-inches) or approximately equal cross dimension greater than 100 mm x 115 mm (4" x 4-1/2-inches).

1.5 QUALITY ASSURANCE

- .1 Installers to have adequate experience in timber framing and experience working on heritage buildings.
- .2 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .3 Plywood identification: by grade mark in accordance with applicable CSA standards.

1.6 ACTION SUBMITTALS

- .1 Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - .1 Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - .2 Submit proof of compatibility between treated products and fasteners to be used.
 - .3 Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.7 DELIVERY, STORAGE AND HANDLING

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

PART 2 PRODUCTS

2.1 GENERAL

- .1 All lumber products: softwood, moisture content 19% or less in accordance with the following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.

2.2 LUMBER MATERIALS

- .1 General for all lumber products: softwood, moisture content 19% or less in accordance with the following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Boards:
 - .1 Plates, sills, blocking, furring, strapping: Standard and better unless noted otherwise
- .3 Dimension framing:
 - .1 Partitions and exterior walls: stud grade
 - .2 Joists, rafters and other framing: No. 2 and better

2.3 OWNER SUPPLIED MATERIAL

- .1 The Owner will provide the following:

TIMBER JOINT SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
7" x 7"	8'-0"	22	2 for shiplap joints, 20 for practice (see details)
6" x 8"	8'-0"	22	2 for scarf joints, 20 for practice (see details)
6" x 6"	8'-0"	23	1 for scarf joint, 2 for diagonal bracing, 20 for practice (see details)
FENCE TIMBER SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
6" x 6"	12'-0"	5	5 posts required
2" x 4"	8'-0"	8	8 cross bars required (2 per section)
1" x 4"	8'-0"	50	Approx. 46 boards required (allow extra)
DECK BOARD TIMBER SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
1" X 6"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 8"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 10"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 12"	10'-0"	6	Approx. 4 boards required (allow extra)
2" x 10"	12'-0"	3	Approx. 3 boards required for blocking
HORIZONTAL CLAPBOARD SIDING SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
Match Existing	14'-0"	20	For general replacement use

2.4 MISCELLANEOUS LUMBER

- .1 General: Provide miscellaneous lumber for support or attachment of other construction, including the following:
 - .1 Blocking
 - .2 Nailers
 - .3 Dowels

- .2 For blocking not used for attachment of other construction, Stud or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- .3 For blocking and nailers used for attachment of other construction select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work. Blocking to match existing species and be cut from timber supplied by Owner.

2.5 PLYWOOD

- .1 Roof and exterior wall sheathing materials
 - .1 Douglas fir plywood (DFP): to CSA O121, SHG
 - .2 Canadian softwood plywood (CSP): to CSA O151, SHG
- .2 Plywood Blocking: DFP or CSP, SHG, T&G edge.

2.6 WOOD CLEANER AND TREATMENT FOR EXPOSED TIMBERS

- .1 Biodegradable biological solution containing quaternary ammonium solution designed to clean mold, algae, mildew, lichens, and general soiling from wood without the use of acids, salts or bleach.
 - .1 Boracol 20-2 BD as marketed by Sasco Products Ltd.: Contractor to provide 1 – 20L pail of Boracol 20-2 BD and apply as directed by Departmental Representative.

2.7 FASTENERS

- .1 General: all fasteners to have hot-dip zinc coating complying with ASTM A153.
- .2 Nails and Screws: CSA B111.
- .3 Power-Driven Fasteners: NES NER-272.
- .4 Wood Screws: ASME B18.6.1.
- .5 Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.
- .6 Lag Bolts: ASME B18.2.3.8M.
- .7 Bolts: Steel bolts complying with ASTM F 568M, Property Class 4.6; with ASTM A 563M hex nuts and, where indicated, flat washers.
- .8 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - .1 Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 **EXECUTION**

3.1 **INSTALLATION, GENERAL**

- .1 Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- .2 Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- .3 Framing Standard: Comply with more stringent of NBCC latest edition Part 9 and these specifications.
- .4 Metal framing anchors: install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- .5 Do not splice structural members between supports unless otherwise indicated.
- .6 Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- .7 Comply with manufacturer's instructions for applying field treatment to cut surfaces of preservative-treated lumber.
 - .1 Use inorganic boron for items that are continuously protected from liquid water.
 - .2 Use copper naphthenate for items not continuously protected from liquid water.
- .8 Securely attach rough carpentry work to substrate by anchoring and fastening.
- .9 Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- .10 Contractor's Personnel to have a minimum of 5 years' experience in timber framing on heritage buildings.
- .11 Do not use glue.

3.2 **WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION**

- .1 Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- .2 Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 **WOOD FURRING INSTALLATION**

- .1 Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 PROTECTION

- .1 Protect miscellaneous rough carpentry from weather. Fabrication work to be performed inside provisions warehouse. If, despite protection, miscellaneous rough carpentry becomes wet, apply borate treatment. Apply borate solution by spraying.
- .2 Provide tarps and plywood under equipment and areas of work to protect existing construction from sustaining damage. Remove all traces of plywood and tarps before completion of project.

3.5 CLEANING AND TREATMENT OF TIMBERS

- .1 Clean exposed wood timbers by applying biological cleaner with a brush, roller or sprayer and allow to remain on timber as recommended by manufacturer. Scrub with a soft nylon or natural bristle brush to loosen mold, dirt, and staining. Use of metal brush is not permitted. Rinse cleaner with clean, potable water.
- .2 Apply treatment for mold, fungi and decay as per manufacturer's instructions taking care to cover and protect adjacent surfaces not intended to receive treatment.

END OF SECTION

PART 1 **GENERAL**

1.1 **WORK OF THIS SECTION**

- .1 Work of this section includes but is not limited to:
 - .1 Ventilation mat and underlayment over roof sheathing.
 - .2 Installation of cedar shingles.

1.2 **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .2 CSA A123.3-M1998, Asphalt or Tar Saturated Roofing.
 - .1 CSA B111-1974, Wire Nails, Spikes, and Staples.
 - .2 CSA O118.2-M1981, Eastern White Cedar Shingles (metric version).

1.3 **SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of flashing installation.

1.4 **SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate full size shingles, of finish and profile specified.

1.5 **JOB MOCK-UP**

- .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct 1200 x 1200 mm panel of shingle and shake pattern including eave ridge and valley details.
- .3 Mock-up may be part of finished work. Remove mock-up when directed.
- .4 Allow 24 hours for inspection of mock-up by Engineer before proceeding with shingle and shake work.

1.6 **STORAGE AND HANDLING**

- .1 Deliver, handle, store and protect materials in accordance with Section 01 60 00 - Product Requirements.
- .2 Provide and maintain dry, off-ground weatherproof storage.

- .3 Remove only in quantities required for same day use.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construct Waste Management & Disposal, and with Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Wood cut-offs are to be diverted from landfill by disposal into the on-site wood recycling bin removed for disposal at the nearest wood recycling facility.
- .5 Reusable materials are to be diverted for reuse at nearest used building materials facility or similar type facility.
- .6 Unused preservatives materials are to be diverted from landfill through disposal at a special wastes depot.

1.8 UNUSED MATERIALS

- .1 Unused shingles remain property of owner.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Cedar Shingles to be provided by Owner.

2.2 ACCESSORIES

- .1 Nails: to CSA O118.1, Appendix E, CSA O118.2, Appendix D.
 - .1 Staples are not an acceptable method of attachment.
- .2 Continuous Ventilation Mat: A three-dimensional nylon mesh purposely fabricated as a material to allow for air circulation behind cedar shingles.
- .3 Roll Roofing/Underlayment:
 - .1 Membrane: self-adhering one ply modified bituminous roll roofing, grey colour, 180 g/m2 minimum; or approved equivalent.
 - .2 Primer: as per membrane manufacturer's recommendations.
- .4 Sheathing Paper:
 - .1 to CAN/CGSB-51.32-M77, spunbonded olefin type.
 - .2 Tape: premium sealing tape recommended by paper manufacturer.

PART 3 **EXECUTION**

3.1 **APPLICATION**

- .1 Do wood shingle work in accordance with NBC and CSA O118.2, Appendix B, except where indicated otherwise.
- .2 Space shingles from 6 to 10 mm.
- .3 Stagger joints minimum of 40 mm in succeeding courses. Ensure that in any 3 courses no two joints are in alignment.
- .4 Use two nails per shingle. Space nails 20 mm from edge and 40 mm above butt line of following course.
- .5 Drive nails flush but do not crush shingles.

3.2 **SHINGLE ROOFING**

- .1 Underlayment
 - .1 Install underlayment and primer as per manufacturer's instructions, unless otherwise noted.
 - .2 Install underlayment under roof shingles, as per drawing. Overlap membrane 150 mm each way, lapped to shed water away from horizontal seams.
- .2 Continuous ventilation mat
 - .1 Install ventilation mat continuous over top of underlayment and under shingles, as per manufacturer's installation instructions.
- .3 Install shingles with 140 mm weather exposure and having triple thickness of shingle at any given point.
- .4 Double shingles at eaves, projecting butts 40 mm from first sheathing board. Project shingles 19 mm minimum at gable ends.
- .5 Lay shingles with grain perpendicular to eaves.
- .6 Saw shingles parallel to valley centre line. Do not break joints into valley.
- .7 Apply strip of sheathing paper minimum 200 mm wide over hips and ridges. Use shingles of uniform width approximately 150 mm wide. Apply shingles at same weather exposure as field of roof.
- .8 Install flashings interleaved between shingles at vertical junctions and where indicated on drawings.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Related Requirements
 - .1 Section 08 62 13 – New Wood Window Sashes and Frames
 - .2 Section 09 91 00 – Painting for Wood Work - Historic.

1.2 **REFERENCES**

- .1 References:
 - .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

1.3 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples.
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit 150 x 150 mm size samples of each type and thickness of glass
- .3 Certificates.
 - .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test and Evaluation Reports.
 - .1 Certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 **CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data
 - .1 Submit operation and maintenance data for glazing for incorporation into manual.

1.5 **QUALITY ASSURANCE**

- .1 Qualifications
 - .1 The glazer and personnel shall be of recognized standing in the industry, specializing in the area of work and known to have been responsible for satisfactory work equal to that specified..
- .2 Certificates
 - .1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups.
 - .1 Construct mock-up to include glass and putty installation.
 - .2 Mock-up will be used:

- .1 To judge quality of work, substrate preparation, operation of equipment and material application.
- .3 Locate where directed.
- .4 Allow 72 hours for inspection of mock-up before proceeding with work.
- .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements.
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements.
 - .1 Store materials glazing off ground and glazing compounds indoors between 18 degrees C and 23 degrees C and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect glazing and accessories from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management.
 - .1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management plan.

1.7 FIELD CONDITIONS

- .1 Ambient Conditions.
 - .1 Install glazing compounds when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.
 - .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Flat Glass: Float glass, to CAN/CGSB-12.3, clear, 2 mm thick.

2.2 ACCESSORIES

- .1 Glazing compounds:
 - .1 Linseed oil putty, by same manufacturer as paint system, putty components:
 - .1 Linseed oil, raw: concentration 35-55%
 - .2 Calcium carbonate: concentration 45-65%
 - .2 Shellac flakes, de-waxed.
- .2 Glazing points: non-ferrous metal.
- .3 Tools:

- .1 Clear glass jar with lid.
- .2 Denatured alcohol (methyl hydrate).
- .3 Pumice.
- .4 Soft brush.

PART 3 **EXECUTION**

3.1 **EXAMINATION**

- .1 Verification of Conditions.
 - .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
 - .1 Verify that openings for glazing are correctly sized and within tolerance.
 - .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
 - .3 Visually inspect substrate.
 - .4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .5 Proceed with installation only after unacceptable conditions have been remedied.
 - .6 Note that glass sizes may vary at each opening.

3.2 **PREPARATION**

- .1 Sand and clean glazing rebates.
- .2 Before applying glazing putty, prime the glazing rebate with a mixture of shellac flakes and alcohol.
- .3 Pour shellac flakes to a depth of 13 mm in the bottom of a small clear glass jar and add enough alcohol to just cover the flakes. Mix with a stick to the consistency of motor oil.
- .4 Brush shellac mixture into all rebates.
- .5 Seal any remaining mixture in a glass container and store in a dark, cool location for up to 2 weeks. Appropriately discard all unused mixture thereafter.
- .6 Allow 2 hours to dry before applying putty.

3.3 **INSTALLATION**

- .1 Cut replacement glass to suit size of existing lights and to clearances recommended by glass manufacturer. Each pane of glass is to be undersized about 1.5 mm around the perimeter.
- .2 Set glazing lights in traditional manner, using glazing putty.
 - .1 Empty the entire container of putty on a non-absorbent surface and knead until soft before use. This will be easier if the putty is warmed in microwave.
 - .2 Use putty at a temperature between 15 degrees C and 25 degrees C. If the putty is too sticky, knead on a piece of cardboard to remove some of the oils. Do not add chalk to the putty, as this will cause separation of the product.
 - .3 If the putty is too hard, re-warm the putty.

- .4 Use warmer softer putty for back puttying and harder putty for bevel putty.
- .3 Apply back putty to the rebates about 1-2 mm thick but with enough putty so that the glass is well seated and there are no gaps between the glass and the rebates.
- .4 Set glass on full bed of putty to proper frame tolerances. Ensure it is evenly seated.
- .5 Install glazing points at 300 mm on centre, with edge point maximum 75 mm from corners.
- .6 Neatly apply exterior putty bevel in line with edges of stiles and rails.
- .7 Allow putty to set up for 24 hours before striking off excess.
- .8 Tool putty to true, even lines, and free of creases, cavities, bubbles, and other defects which will mar its appearance and performance.
- .9 Apply ground pumice to each pane of glass, sequentially. Spread liberally with a soft brush, allowing the pumice to absorb any oil residue. Sweep the pumice off the glass. The glass should take on a nice shine, free of oily prints. The discarded pumice may be used again for subsequent panes.
- .10 Allow putty to cure for minimum 72 hours before painting.
- .11 Paint cured putty in accordance with Section 09 91 00 – Painting for Wood Work.
- .1 Lap paint onto glass by 2 mm with application of the exterior and interior finishing paint coats.

3.4

CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .1 Remove traces of primer, caulking.
 - .2 Remove glazing materials from finish surfaces.
 - .3 Remove labels.
 - .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .2 Final Cleaning:
 - .1 Upon completion, remove surplus materials, rubbish, tools, and equipment.

3.5

PROTECTION

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

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Related Requirements
 - .1 Section 09 91 00 – Painting for Wood Work - Historic
 - .2 Section 08 78 13 – Forged Hardware

1.2 **REFERENCES**

- .1 References:
 - .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 Architectural Woodwork Standards Manual (Edition 2) 2014.
 - .2 Canadian Standards Association (CSA International)
 - .1 CSA O141-05 (2014), Softwood Lumber.
 - .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .4 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.3 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Note that drawings are a guide for pricing and to illustrate detailing. Contractor shall site measure for each opening and shall produce a shop drawing for each opening showing fabrication and installation of each unit.
- .3 Shop Drawings.
 - .1 Submit drawings.
 - .2 Revise and resubmit as directed.

1.4 **QUALITY ASSURANCE**

- .1 Arrange for Departmental Representative to inspect period wood door fabrication shop during the Work.
- .2 Mandatory Requirements:
 - .1 Contractor to have adequate experience in the replication of historic wood doors on projects of similar size and complexity to Work on this Contract.
 - .2 If requested, provide description, contract value, and contact person for three similar projects undertaken.
 - .3 Carry out work of this section using skilled tradespersons trained and experienced in the fabrication of traditional wood windows.
 - .4 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this section.
- .3 Mock-ups:

- .1 Construct a full-size complete mock-up of one door and frame.
- .2 Adjust techniques as directed.
- .3 Notify Departmental Representative 5 days in advance of mock-up preparation. When accepted, mock-up demonstrates minimum standard for this work.
- .4 Mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements.
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements.
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect doors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management.
 - .1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management plan.

1.6 WARRANTY

- .1 Extended Period.
 - .1 For new doors and frames, two years for the new wood doors and related accessories, and same for workmanship including warping, fit and operation.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Softwood lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10%, grade 'C' Select, all quarter cut with edge grain to the weather, Douglas Fir.
- .2 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, ¼ cut clear white oak, moisture content of maximum 10%.
- .3 Hardware:
 - .1 Install two strap hinges with pintles and one Suffolk latch set for each door.

2.2 NEW DOOR FABRICATION

- .1 New doors to be plank doors with ledges.
 - .1 Door planks to be made from Douglas fir, quarter sawn, with edge grain to the weather. Moisture content of components not to exceed 10 percent at time of fabrication.

- .2 Planks to be cut from random widths ranging from 5 ½” to 7 ½”, minimum width of hanging and shutting plank is to be 5”, both hanging and shutting plank to be equal ½” +/- in width.
- .3 Ledges to be quarter cut white oak.
- .4 Pegs and wedges to be oak, pegs about 12 mm square, but slightly diamond shaped in section.
- .5 Stamp year of fabrication into the edge of the hanging plank, letters 10 mm high and 3 mm deep.
- .6 Once door is ready for assembly prime the tongue and groove edges with one coat of linseed oil and one coat of linseed oil paint in accordance with Painting Wood Work. No glue is to be used in the construction.

2.3 FINISHES

- .1 Proceed in accordance with Section 09 91 00 – Painting for Wood Work.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions.
 - .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Size door frame so that there is about a 12 mm shim space at sides and head between new door frame and framing.
- .2 Brace shop fabricated door components to maintain squareness and rigidity during shipment and installation.
- .3 Install unit true and square. Use custom made cedar shims to position frame in opening. Place shims at corners only, two opposing shims at each location and set securely.
- .4 Install screws adjacent to shims into the rough bucks to fasten frames.
- .5 Assume need to trim clapboard back and/or scribe trim to clapboard and /or vary the size of the trim to achieve a good fit against the clapboard.
- .6 Blacksmith to be available to assist with hardware installation at no extra cost to client.
- .7 Install hardware in accordance with approved mock ups.
- .8 Pre-drill all attachment points for hardware.

- .9 Complete final painting inside and out, after installation.

3.3 ADJUSTING

- .1 Adjust doors and hardware just prior to completion of construction to function freely and properly.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
.2 Repair damage to adjacent material caused by door installation.
.3 Protect floors and other surfaces for duration of project, using plywood and tarpaulins as necessary. Adjust as directed by Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED REQUIREMENTS**

- .1 Section 08 03 80 – Historic Glazing
- .2 Section 09 91 00 – Painting of Wood Work - Historic

1.2 **REFERENCES**

- .1 Canadian Standards Association (CSA International)
 - .1 CSA O141-05 (2014), Softwood Lumber.
- .2 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.3 **ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Note that drawings are a guide for pricing and to illustrate detailing. Contractor shall site measure for each opening and shall produce a shop drawing for each opening showing fabrication and installation of each unit.
- .3 Shop Drawings.
 - .1 Submit drawings.
 - .2 Revise and resubmit as directed.

1.4 **QUALITY ASSURANCE**

- .1 Arrange for Departmental Representative to inspect period wood window fabrication shop during the Work.
- .2 Mandatory Requirements:
 - .1 Contractor to have adequate experience in the replication of historic wood windows on projects of similar size and complexity to Work on this Contract.
 - .2 If requested, provide description, contract value, and contact person for three similar projects undertaken.
 - .3 Carry out work of this section using skilled tradespersons trained and experienced in the fabrication of traditional wood windows.
 - .4 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this section.
- .3 Mock-ups:
 - .1 Construct a full-size complete mock-up of sash and frame for window type W1.
 - .2 Adjust techniques as directed.
 - .3 Notify Departmental Representative 5 days in advance of mock-up preparation. When accepted, mock-up demonstrates minimum standard for this work.
 - .4 Mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 WARRANTY

- .1 The warranty period to be as follows:
 - .1 New wood sashes and related accessories: 2 years.
 - .1 Workmanship, including warping, fit and operation: 2 years.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Softwood lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10%, Grade 'C' Select, quarter cut with edge grain to the weather, species shall be Douglas Fir.
- .2 For interior stops: Eastern White pine, maximum moisture content 10%, Grade 'C' select.
- .3 Glazing: in accordance with Section 08 03 80 – Historic Glazing.
- .4 Hardware: Brass slot screws and grommets for interior stops, Ives # 9 or equivalent. Finishes: in accordance with Section 09 91 00 – Painting of Wood Work.

2.2 FABRICATION

- .1 All components to be one piece, full length without joints, and no laminations other than those shown in drawings.
- .2 Date stamp new component on a hidden edge with year of fabrication; letters 10 mm high, 3 mm deep.
- .3 New sash and frames to be Douglas Fir, quarter sawn, with edge grain to the weather. Moisture content of components not to exceed 10 percent. Pegs to be oak 10mm 'square' but slightly diamond shaped in cross section.
- .4 Size window frames so that there is a 10 mm shim space at each side and at head between outside of frame and adjacent framing members.
- .5 Construction:
 - .1 Mortise and Tenon:

- .1 Top rail and stile single through mortise and tenon wedged draw-bore pegged.
- .2 Bottom rail and stile through single mortise and tenon wedged draw-bore pegged.
- .3 Vertical muntin bars to be continuous and wedged, pegged and drawbored. Other muntins to have stub tenons.
- .4 Corners of frames to be notched housing.
- .6 Dry fit and assemble window components before completing fabrication.
- .7 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1000 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1000 mm.
- .8 Once sash stiles and rails and frame jambs, sills and head are ready for assembly, prime, apply oil, pine tar and paint in accordance with Section 09 91 00 – Painting for Wood Work prior to assembly. No glue is to be used in the construction.

PART 3 **EXECUTION**

3.1 **EXAMINATION**

- .1 Verification of Conditions.
 - .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation.
 - .1 Visually inspect substrate.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

3.2 **INSTALLATION**

- .1 Proceed with installation only after unacceptable conditions have been remedied.
- .2 Install unit true and square. Use custom made cedar shims to position frame in opening. Place shims at corners only, two opposing shims at each location and set securely.
- .3 Install screws adjacent to shims into the rough bucks to fasten frames.
- .4 Assume need to trim clapboard back and/or scribe trim to clapboard and /or vary the size of the trim to achieve a good fit against the clapboard.
- .5 Install screws and grommets about 75 mm from each end of stops and about 300 mm o.c.
- .6 Complete final painting inside and out, after installation, do not paint screws and grommets.

3.3 **CLEANING**

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Remove any and all oil or paint soaked materials from site at the end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment.

3.4 PROTECTION

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

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Sections 08 14 00 – New Wood Doors and Frames

1.2 **SCOPE OF WORK SUMMARY**

- .1 Forge and install six pairs of hinges with pintles and six Suffolk lock sets complete with all fasteners.
- .2 Forge and install 5 sets of hooks and eyes.
- .3 Provide and install one high quality hasp & clasp and one high quality padlock with 5 keys, on door identified by Departmental Representative.
- .4 Paint all surfaces of all forged hardware prior to packing and shipping.
- .5 Be available to assist carpenters on site with installation at no extra cost to client.

1.3 **SUBMITTALS & REVIEW**

- .1 As part of tender submit photographs of three sets of similar forged hardware completed by bidder in the last 5 years.
- .2 For each of the three projects provide name of historic site, client's name and contact information.
- .3 Similar forged hardware is defined as hardware that required all traditional forms of blacksmithing work such as forge welding, riveting, drawing out, upsetting, etc.
- .4 The successful bidder shall forge one mock up hinge with pintle and one Suffolk latch set for review prior to undertaking the remaining work. These mock ups, once approved, may be incorporated into the work.
- .5 Revise and resubmit as directed.
- .6 On site install a pair of hinges and one Suffolk latch set on one door for review as a mock up.
- .7 Provide five days' notice of need for review by consultant.
- .8 Do not begin fabrication of strap hinges until door widths are confirmed on site.

1.4 **COORDINATION**

- .1 Coordinate all work between the fabrication of the overthrow and the lamp.

1.5 **QUALITY ASSURANCE**

- .1 All blacksmithing work for this project shall be done to the highest standard by a blacksmith with adequate experience.
- .2 The blacksmith must demonstrate a high degree of skill and experience including the ability to upset, draw out, forge weld, etc.

- .3 The consultant will reject the blacksmithing work if a high level quality cannot be demonstrated. This will be judged by the finish texture, absence of hammer marks, and structural integrity

PART 2 **PRODUCTS**

2.1 MATERIALS

- .1 Mild steel in stock sizes indicated on drawings.
- .2 Screws and carriage bolts to be 300 series stainless steel, the former to have slot heads as shown.
- .3 Air abrasive media: aluminum oxide, 100 grit.
- .4 Paint System:
 - .1 Primer – Epoxy, zinc rich, two component primer, grey ready mixed color, no tint possible. A high solids, two component, organic zinc rich primer for structural steel and other carbon steel surfaces exposed to severe environments.
 - .1 Pittsburg Coatings UC65383 is the acceptable product.
 - .2 Base coats – a polyamide two component epoxy intended for exterior use with barrier type protection. Apply two (2) coats.
 - .1 Pittsburg Coatings Pitt Guard 95-245 is the acceptable product.
 - .3 Finish coats – a gloss urethane enamel recommended by system manufacturer as a topcoat where color and gloss retention are primary considerations. Apply two (2) coats.
 - .1 Pittsburg Coatings Pitthane 35, 95-850 series is the acceptable product, colour black

2.2 FABRICATION

- .1 Build work square, true, straight, level and accurate to required size, with joints closely fitted and properly secured.
- .2 Where practical, fit and shop assemble work, ready for erection.

2.3 EQUIPMENT AND FACILITIES

- .1 Provide indoor facilities off-site (workshops) for all aspects of this work including but not limited to layout, surface preparation and all blacksmithing work.
- .2 Provide machine shops, paint booths, and all other facilities required to perform the work, off-site.
- .3 Equip the workshop with the following tools and equipment:
 - .1 A coal-fired forge that is of sufficient size to heat sections of steel to working temperatures.

PART 3 **EXECUTION**

3.1 **BLACKSMITHING GENERAL**

- .1 All welding to be forge welding done in the fire. Gas or electric welding is not permitted.
- .2 All work shall use the traditional techniques of drawing out, upsetting, forge welding, riveting, etc.
- .3 The quality of work will be judged by the finish texture of the work, which is the absence of hammer marks, the structural integrity of structural connections such as forge welds, etc.
- .4 Date stamp the back of each hinge and the back of each Suffolk latch with the year of fabrication, lettering to be large enough and deep enough to be legible after painting.

3.2 **PAINTING**

- .1 Coordination with painting is a critical aspect of the reassembly process.
- .2 Immediately prior to priming all surfaces are to be lightly cleaned with air abrasive.
- .3 Prior to assembly of any threaded connections, apply the zinc rich primer and the two epoxy base coats to all surfaces of all components except for threaded holes and threaded stems.
- .4 Once paint is sufficiently cured assemble the components.
- .5 Apply two coats of the polyurethane finish coats once all components have been assembled.
- .6 All painting to be applied in accordance with manufacturer's printed instructions and free of sags, runs, drips or other imperfections.
- .7 Apply all by brush.
- .8 All surfaces to be painted.
- .9 Touch up imperfections at job end.
- .10 Colour to be white, submit sample for review.

3.3 **TRANSPORT AND HANDLING**

- .1 All components to be photographed and then wrapped in foam or bubble wrap and crated before it leaves the shop to protect from weather, shipping mishaps, etc.

3.4 **INSTALLATION**

- .1 Pre-drill for all attachment points.
- .2 Complete the hardware installation on one door for review as a mock up prior to completing remainder.
- .3 Revise procedures as directed.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED REQUIREMENTS**

- .1 Section 08 03 80 – Historic Glazing
- .2 Section 08 14 00 – New Wood Doors and Frames
- .3 Section 08 62 13 – New Wood Window Sashes and Frames

1.2 **REFERENCES**

- .1 References:
 - .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1-GP-2M-80 Oil, Linseed, Boiled.
 - .2 CGSB 1-GP-16M-79 Shellac Varnish.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .3 Master Painters Institute (MPI)
 - .1 Maintenance Repainting Manual 2015, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.
 - .4 National Fire Code of Canada.

1.3 **ADMINISTRATIVE REQUIREMENTS**

- .1 Scheduling.
 - .1 Submit work schedule for various stages of painting to Departmental Representative for approval review. Submit schedule minimum of 48 hours in advance of proposed operations.
 - .2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.
 - .3 Obtain written authorization from Departmental Representative for changes in work schedule.
 - .4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

1.4 **ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data.
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for paints and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Paint Samples.

- .1 Submit triplicate 100 x 200 mm "draw-downs" of each colour specified on applicable materials for Departmental Representative's review prior to commencement of the work.
- .2 Colours and finishes to be selected by Departmental Representative. Revise and resubmit.
- .3 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
- .4 Interior and exterior faces of windows, doors and frames shall be white to match existing.
- .5 Exterior trim to be green to match existing.

.4 Manufacturer Reports.

- .1 Provide WHMIS Material Safety Data Sheets (MSDS) in accordance with Section 01 35 30 - Health and Safety Requirements for paints and coating materials to be used.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data.

- .1 Provide maintenance data for incorporation into Maintenance Manual.

.2 Record Documentation.

- .1 Provide records of products used. List products in relation to finish system and include following:
 - .1 Product name, type and use (i.e. materials and location).
 - .2 Manufacturer's product number.
 - .3 Colour code numbers.
 - .4 MPI Environmentally Friendly classification system rating.
 - .5 Manufacturer's Material Safety Data Sheets.

1.6 QUALITY ASSURANCE

.1 Qualifications.

- .1 Installers/Applicators/Erectors.
 - .1 Contractor: to have adequate experience in painting historic wood work. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work, to have adequate experience in the work specified.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeypersons in accordance with applicable trade regulations.

.2 Materials

- .1 Conform to latest MPI requirements for exterior repainting work including cleaning, preparation and priming.

- .2 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, glazing putty, linseed oil, pine tar and shellac) to be from a single manufacturer for each system used.
- .3 Paint materials to be the highest quality product and shall be compatible with other coating materials as required.
- .3 Mock-ups.**
 - .1 Provide mock-up in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Prepare and repaint designated surface or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
 - .3 When approved, repainted surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site exterior painting work.
 - .4 Include all aspects of surface preparation including paint removal to bare wood and priming and application of one finish coat
 - .5 Provide additional mock-ups on-site for review by Departmental Representative if initial tests prove unsatisfactory.
 - .6 Provide Departmental Representative five working days of notice prior to undertaking work.
 - .7 Approved mock-up may be incorporated into final work.
 - .8 Assume the need for two custom colours for doors and two custom colours for windows.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in manufacturers' original container with labels intact.
- .2 Delivery and Acceptance Requirements.**
 - .1 Ensure dry delivery and storage of materials and equipment at site.
- .3 Storage and Handling Requirements.**
 - .1 Store materials and equipment in a well-ventilated place between 10 degrees C and 32 degrees C, and protect from direct sun.
 - .2 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.
 - .3 Remove paint materials from storage only in quantities required for same day use.
 - .4 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

1.8 SITE CONDITIONS

- .1 Surface preparation work shall be performed in favourable weather conditions as defined herein. The temperature range within the work area shall be between 10 degrees C to 30 degrees C.

- .2 Wood being prepared must have a moisture content below 10% by weight. Protect area from moisture until final painting is complete and cured.
- .3 Protect exterior surfaces from moisture and water as necessary from time of preparation until the final coats of paint have sufficiently dried to be unaffected by moisture and/or water.
- .4 Use of a heated enclosure around the work area is acceptable.
- .5 Mask or otherwise protect surrounding or adjacent historic fabric and occupants from all activities associated with this work. No fastenings associated with hoarding or other protection shall be installed in historic material without prior approval of Departmental Representative.
- .6 Prevent dust associated with these activities from spreading beyond the immediate work area.
- .7 Do not paint during or immediately following foggy, rainy or frosty weather, nor when the temperature is expected to go below 10 degrees C before the coating is dry, in excessively humid or windy weather, or on damp surfaces (wood maximum 10% moisture).

1.9 WARRANTY

- .1 The warranty period for the painting of sashes and new components is to be 2 years.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Paint, linseed oil paint, by same manufacturer as putty compound, to CGSB 1-GP-2M.
 - .1 Paint shall consist of cold-pressed, cleaned, filtered, sterilized, well-matured, cooked linseed oil only, with no solvents.
 - .2 At factory add 20% zinc by volume.
 - .3 Pigments shall be made from titanium oxide, iron oxides, chromium oxide green and ultramarine blue.
 - .4 Tinting: as recommended by paint manufacturer.
 - .5 Wood primer: Boiled linseed oil type, by same manufacturer as paint.
 - .6 Cleaning solution: linseed oil soap, by same manufacturer as paint.
 - .1 Mix linseed oil soap with boric acid; 1 tablespoon of acid to 1 litre of soap.
- .2 Wood Sealer: Shellac to CGSB 1-GP-16M.
 - .1 Mix shellac flakes and methyl hydrate in a glass jar to the consistency of motor oil to be used for sealing knots and encapsulate extant grained finish. Mix only enough for one day's use.
- .3 Glazing Putty
 - .1 Linseed oil based glazing putty by same manufacturer as linseed oil paint.
- .4 Dark Pine Tar

- .1 Traditional pine tar made by burning the resin out of pine tree stumps.

2.2 TOOLS

- .1 Brush: natural bristle brushes of size and shape to suit application.
- .2 Rags: micro fibre rags.
- .3 Mechanical tools without sharp edges.
- .4 Scouring pad: plastic mesh.
- .5 Scrub brushes: natural fibre bristle or soft plastic type.

2.3 PAINT COATING SCHEDULE

- .1 Primer for new wood to receive one coat of boiled linseed oil, applied warm onto warmed surface. To be followed by 4 coats of boiled linseed oil paint.
- .2 Prior to assembly, all hidden surfaces, especially end grain, of all components to be primed with one coat of boiled linseed oil, applied warm onto warmed surface.
- .3 Wipe off all excess linseed oil prior to applying linseed oil based paint.
- .4 The outside of all window and door frames, including jambs, head and sill, to receive two coats of dark pine tar mixed 1:1 with boiled linseed oil, applied warm to warmed surfaces, paying particular attention to construction joints and end grain.
- .5 For new sash and door joinery, undertake the following, once individual pieces are fabricated but prior to assembly: prime all end grain at mortice and tenons with one coat of boiled linseed oil, applied warm onto warmed surface. Follow this by mixing and applying boiled linseed oil mixed with linseed oil based glazing putty to create a slurry, rub this slurry into the end grain and wipe off excess.

Part 3 EXECUTION

2.4 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.
- .2 Protect general public and building occupants in and about the building.
- .3 Paint doors prior to installing hardware.
- .4 As painting operations progress, place "WET PAINT" signs to approval of Departmental Representative.
- .5 To avoid spontaneous combustion, follow manufacturer's printed directions for handling linseed oil, tools, rags, etc. Remove any and all oil soaked rags from the site each day and soak rags in water off site and discard.
- .6 Ensure protective coverings are breathable.

2.5 SURFACE PREPARATION

- .1 Seal knots with shellac as recommended by paint manufacture and in accordance with manufacturer's written instructions.
- .2 Keep all surfaces dry until painting is complete.
- .3 Remove dust, dirt, and surface debris by brushing, wiping with dry, clean cloths or compressed air.
- .4 All wood surfaces to be painted shall be thoroughly sanded with 120 grit sandpaper and wiped clean.
- .5 Clean all surfaces with linseed oil soap using scouring pad. Rinse thoroughly as directed by manufacturer, taking care not to over soak. Let dry 24 hours.
- .6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats.

2.6 COATING APPLICATION

- .1 Application
 - .1 Method of application to be as approved by Departmental Representative. Apply paint by brush and micro fibre rags. Conform to manufacturer's application instructions unless specified otherwise.
 - .2 Each paint coating to be a minimum of 150 microns thick and a maximum of 250, measured wet.
 - .3 Prime all surfaces with boiled linseed oil applied warm.
 - .4 Heat boiled linseed oil primer and maintain a temperature of 50-60 degrees C. Also heat the surface of the wood with a hair dryer as application proceeds.
 - .5 For new sash and door joinery, undertake the following, once individual pieces are fabricated but prior to assembly: prime all end grain at mortice and tenons with one coat of boiled linseed oil, applied warm onto warmed surface, allow to dry. Follow this by mixing and applying boiled linseed oil mixed with linseed oil based glazing putty to create a slurry, rub this slurry into the end grain and wipe off excess, allow to dry.
 - .6 Note that the entire outside of window and door frame sills, i.e., all surfaces which are not being painted, are to receive two coats of dark pine tar on bare wood. In particular work pine tar into end grain and construction joints.
 - .7 Pine tar to be mixed 50/50 with boiled linseed oil and is to be applied warm at 60 degrees C. The surface of the wood is also to be warmed as the mixture is applied.
 - .8 Paint application:
 - .1 Prior to mixing paint, remove any skin from the surface. As some settling of pigment may have occurred during shipping, stir the paint thoroughly with a hand-blender before painting.
 - .2 Do not dilute paint with solvents. Where necessary, thin with a maximum 5% boiled linseed oil.
 - .3 Order paint from supplier with added zinc white, 20% by volume, to the paint as a fungicide. As this affects paint colours, samples will be adjusted prior to painting.

- .4 Apply warmed paint in thin coat with a brush and/or micro fibre rags. Note that linseed oil paints are to be applied much more thinly, but in multiple coats, compared to conventional paints.
- .9 Allow boiled linseed oil to properly cure between subsequent coats for minimum time period as recommended by manufacturer. Wipe off excess oil prior to applying paint.

2.7 RE-INSTALLATION

- .1 Remove protective coverings and warning signs as soon as practical after operations cease.
- .2 Remove paint splashes on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .3 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative

2.8 CLEANING

- .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .2 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials and debris.
- .3 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as cleaning and protective materials (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as specified.
- .1 Clean brushes and tools with soap from same line as paint manufacturer.

2.9 PROTECTION OF COMPLETED WORK

- .1 Protect area where paint has been applied.
- .2 On completion of specified work remove surplus materials, tools and equipment and debris on work area; leave clean and tidy to complete satisfaction of Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Moisture testing of substrates.
- .2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under MPI Repainting Maintenance Manual requirements.
- .3 Specific pre-treatments noted herein or specified in the MPI Repainting Maintenance Manual.
- .4 Sealing/touch-up, spot priming, and/or full priming surfaces for repainting in accordance with MPI Repainting Maintenance Manual requirements.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Section 01 78 00 - Closeout Submittals.
- .6 Section 09 91 00 - Painting for Wood Work - Historic

1.3 **REFERENCES**

- .1 Maintenance Repainting Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation, and Approved Product List.
- .2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .3 National Fire Code of Canada.

1.4 **QUALITY ASSURANCE**

- .1 Conform to latest MPI requirements for exterior repainting work including cleaning, preparation and priming.
- .2 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.

- .3 Paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.
- .4 Retain purchase orders, invoices, and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative
- .5 Standard of Acceptance: When viewed using natural prevailing sunlight at peak period of the day (mid-day) on surface viewed, surfaces shall indicate the following:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Soffits: No defects visible from grade at 45° to surface.
 - .3 Final coat to exhibit uniformity of colour and sheen across full surface area.

1.5 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule a minimum of two (2) working days in advance of proposed operations.
- .2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.
- .3 Obtain written authorization from Departmental Representative for changes in work schedule.
- .4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about the building.

1.7 SUBMITTALS

- .1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.
- .2 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.
- .3 Submit WHMIS Material Safety Data Sheets (MSDS) for paints and coating materials to be used.
- .4 Upon completion, submit records of products used. List products in relation to finish system and include the following:
 - .1 Product name, type, and use (i.e. materials and location).
 - .2 Manufacturer's product number.
 - .3 Colour code numbers.

- .4 MPI Environmentally Friendly classification system rating.
- .5 Manufacturer's Material Safety Data Sheets.
- .5 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
 - .1 13 mm birch plywood for finishes over wood surfaces.
- .6 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.8 QUALITY CONTROL

- .1 Painters to have a adequate experience in exterior painting of historic wood buildings.
- .2 Provide a mock-up in accordance with requirements of Section 01 45 00 - Quality Control to Departmental Representative.
- .3 Prepare and repaint mock-up designated exterior surface or item to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures, and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
- .4 When approved, repainted surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site exterior repainting work.

1.9 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - four litre can of each type and colour of finish coating. Identify type and colour in relation to established colour schedule and finish system.
- .3 Deliver and store where directed by Departmental Representative.

1.10 DELIVERY, HANDLING, AND STORAGE

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact.
- .3 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .4 Remove damaged, opened, and rejected materials from site.
- .5 Observe manufacturer's recommendations for storage and handling.

- .6 Store materials and equipment in a secure, dry, well-ventilated area with temperature range between 7°C to 30°C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.
- .7 Keep areas used for storage, cleaning, and preparation, clean and orderly to approval of Departmental Representative. Upon completion of operations, return areas to clean condition to approval of Departmental Representative.
- .8 Remove paint materials from storage in quantities required for same day use.
- .9 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .10 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers, and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.11 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.
 - .2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available.
 - .5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by Departmental Representative and applied product manufacturer, do not perform repainting work when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

- .4 Relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.
- .5 Rain or snow is forecast to occur before paint has thoroughly cured.
- .6 It is foggy, misty, raining or snowing at site.
- .2 Conduct moisture tests using a properly calibrated electronic Moisture Meter.
- .3 Do not perform repainting work when maximum moisture content of substrate exceeds:
 - .1 15% for wood.
- .3 Application Requirements:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10°C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
 - .7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
 - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow, or condensation. Prepare surface again and repaint.

1.12 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.

- .6 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .7 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
- .10 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .11 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Paint materials listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project.
- .2 Paint materials for repaint systems shall be products of a single manufacturer.
- .3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Paints, coatings, thinners, solvents, cleaners, and other fluids used in repainting, shall:
 - .1 Be water-based, water soluble, water clean-up.
 - .2 Be non-flammable
 - .3 Not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
 - .4 Be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

- .5 Be manufactured without compounds which contribute to smog in the lower atmosphere.
- .5 Paints and coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .6 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .8 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award.
- .2 Selection of colours will be from manufacturer's full range of colours, but will closely match the existing.
- .3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .4 Second coat in a three coat repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed with Departmental Representative written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS / SHEEN RATINGS

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss/sheen standard values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of repainted surfaces shall be as specified herein.

2.5 EXTERIOR PAINTING SYSTEMS

- .1 The following paint formulas requires a two coat finish as indicated in the MPI Repainting Maintenance Manual.
- .2 REX 6.2 - Lumber: (siding and trims, not including new doors and windows.).
- .1 REX 6.2A - Latex G4 (over latex primer).
- .2 REX 6.2E - Semi-Transparent Stain.
- .3 New wood doors and windows : Refer to Section 09 91 00 – Painting for Wood Work - Historic
- .4 REX 6.3 - Dressed Lumber: (doors, door and window frames, casings, battens, smooth fascias, etc.)
- .1 REX 6.3L - Latex G4 finish.
- .5 REX 6.4 - Wood Panelling: (plywood siding, fascias, soffits, etc.).
- .1 REX 6.4G - Latex G4 finish.
- .6 REX 6.5 - Wood Decks and Stairs/Steps: (using spaced lumber).
- .1 REX 6.5A - Porch and Floor Acrylic Latex G4 finish (over primer).
- .2 REX 6.5C - Deck Stain.

PART 3 **EXECUTION**

3.1 GENERAL

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting requirements except where specified otherwise.

- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXISTING CONDITIONS

- .1 Prior to commencing work, thoroughly examine site conditions and existing exterior substrates to be repainted and report in writing to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions of surfaces that will adversely affect this work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Wood: 15%.
- .4 No repainting work shall commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor and Inspection Agency. Commencement of work shall not be held to imply acceptance of surfaces except as qualified herein.
- .5 Degree of surface deterioration (DSD) shall be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	Substrate Damage (repair or replacement of surface required by others).

3.3 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.
- .2 Cover or mask windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.
- .3 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .4 Protect factory finished products and equipment.
- .5 Protect general public and building occupants in and about the building.

- .6 Remove electrical cover plates, light fixtures, surface hardware on doors, and surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Items shall be securely stored and re-installed after painting is completed.
- .7 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .8 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.4 CLEANING AND PREPARATION

- .1 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Use trigger operated spray nozzles for water hoses.
 - .5 Allow surfaces to drain completely and to dry thoroughly.
 - .6 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or such organic solvents to clean up water-based paints.
- .2 Where required, pressure wash exterior surfaces prior to repainting in accordance with MPI standards for type of surfaces and recommended pressures to ensure complete removal of loose paint, stains, dirt, and foreign matter. This work to be carried out by qualified tradesman experienced in pressure water cleaning. Use of spray equipment such as water hose cleaning will not be considered satisfactory unless specified herein. Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.
- .3 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .4 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
- .5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects from previously painting (e.g. runs, sags, etc.) that are visible from a distance up to 1000 mm.

3.5 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces to be free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Back roll spray applications and brush out runs and sags immediately.
 - .5 Use brushes to work paint into cracks, crevices and places that are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.
- .5 Apply paint coats in a continuous manner and allow surfaces to dry and properly cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats shall not be less than that recommended by the manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .8 Refer to Section 09 91 00 – Painting for Wood Work – Historic for painting methods for new doors and windows.

3.6 MECHANICAL / ELECTRICAL EQUIPMENT

- .1 Unless otherwise noted, repainting shall also include exposed to view/previously painted exterior mechanical and electrical equipment and components (panels, conduits, piping, hangers, ductwork, etc.).
- .2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour and finish to match existing finish unless otherwise noted or scheduled.
- .3 Do not paint over name plates or instruction labels.

3.7 FIELD QUALITY CONTROL

- .1 Field inspection of exterior painting operations may be carried out by Departmental Representative.
- .2 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Co-operate with Departmental Representative and provide access to areas of work.

3.8 CLEAN-UP

- .1 Remove paint where spilled, splashed, splattered, or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- .3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- .4 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers / strippers in accordance with the safety requirements of authorities having jurisdiction and as noted herein.
- .5 Painting equipment shall be cleaned in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations shall be disposed of in a manner acceptable to authorities having jurisdiction.
- .6 Paint and coatings in excess of repainting requirements shall be recycled as noted herein.

3.9 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **GENERAL**

- .1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
 - .2 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3 **CARE, OPERATION, AND START-UP**

- .1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Safety precautions.
 - .3 Procedures to be followed in event of equipment failure.
 - .4 Other items of instruction as recommended by manufacturer of each system or item of equipment.

1.4 **DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235
- .2 Lighting, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 **SUBMITTALS**

- .1 Where indicated submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, accessories, and other items that must be shown to ensure coordinated 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 Quality Control: in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.
 - .2 Submit test results of installed electrical systems.
 - .3 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .6 Manufacturer's Field Reports: submit to Departmental Representative within seven (7) working days of review, verifying compliance of Work and electrical system and instrumentation testing.
- .7 Shop Drawings:
 - .1 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or materials.
 - .2 Where applicable, indicate wiring, single line and schematic diagrams.
 - .3 Include wiring drawings or diagrams showing interconnection with work of other sections.
 - .4 Each shop drawing will be stamped and signed by the Contractor before submitting, stating that he has checked the drawings against the requirements as called for in the Contract Documents and also in the case where the equipment is attached to or connects to other equipment, that is has been properly coordinated with this equipment, whether supplied under Division 26 or under other Divisions.
 - .5 Each shop drawing for non-catalogue items shall be prepared specifically for this project. If brochures are submitted for catalogue items, the brochures shall be marked deficiently indicating the item or items to be supplied.
 - .6 Work shall not be proceeded with on any of the equipment until final review of shop drawings received by the Contractor.
 - .7 Note: Shop drawing review is for general compliance with Contract Documents. No responsibility is assumed by the Engineer for correctness of dimensions or details. Corrections or comments, or lack thereof, made on the shop drawings during the Engineer's review does not relieve the Contractor from compliance with the requirements of the drawings and specifications.
 - .8 If changes are required, notify Engineer of these changes before they are made.
- .8 Operation and Maintenance Data:
 - .1 Provide operation and maintenance data for incorporation into operation and maintenance manuals. Manuals shall be supplied in quantities to Section 01 78 00.

- .2 Include in operations and maintenance data:
 - .1 Details of design elements, construction features, component function and maintenance requirements to permit effective start-up operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
 - .2 Technical data, product data, supplemented by bulletins, exploded views, technical description of items and part lists. Advertising or sales literature not acceptable.
 - .3 Wiring and schematic diagrams and performance curves.
 - .4 Names and addresses of local suppliers for items included in maintenance manuals.
 - .5 Copy of reviewed shop drawings.
- .9 As-Built Drawings – Submit in accordance with 01 78 00 – Closeout Submittals.

1.6 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Departmental Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.
- .4 Notify Departmental Representative of changes required by Electrical Inspection Division prior to making changes.
- .5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Departmental Representative.

1.7 CO-ORDINATION

- .1 Co-ordinate work with work of other divisions to avoid conflict.
- .2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.
- .3 Where interference occurs, Departmental Representative must approve relocation of equipment and materials regardless of installation order.
- .4 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division. The Departmental Representative shall decide the extent of relocation required.

1.8 CUTTING AND PATCHING

- .1 No cutting or patching of existing structure is permitted. Contractor to work with existing structure and install equipment in best concealed location.

1.9 PROTECTION

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark all live parts "LIVE 120 VOLTS", or with appropriate voltage in English.

1.10 RECORD DRAWINGS

- .1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Have the white prints available for inspection at the site at all times and present for scrutiny at each job meeting.

1.11 INSPECTION OF WORK

- .1 The Departmental Representative will make periodic visits to the site during construction to ascertain reasonable conformity to plans and specifications but will not execute quality control. The Contractor shall be responsible for the execution of his work in conformity with the construction documents and with the requirements of the inspection authority.

1.12 SCHEDULING OF WORK

- .1 Work shall be scheduled in phases as per other divisions of the architectural specifications.
- .2 Become familiar with the phasing requirements for the work and comply with these conditions.
- .3 No additional monies will be paid for contractor's requirement to comply with work phasing conditions.

1.13 SYSTEM START-UP

- .1 Instruct Engineer and operating personnel in operation, care and maintenance of systems, system equipment and components.

1.14 WASTE MANAGEMENT & DISPOSAL

- .1 Separate and recycle waste materials in accordance with Division 01.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal: paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

- .4 Divert unused wiring and metal materials from landfill to metal recycling facility as approved by Engineer.
- .5 Place materials defined as hazardous or toxic waste in designated containers.
- .6 Ensure emptied containers are sealed and stored safely for disposal.
- .7 Unused materials must not be disposed of into sewer system, streams, lakes, onto ground or in other locations, where it will pose health or environmental hazard.
- .8 Do not dispose of preservative treated wood through incineration. Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Engineer.
- .9 Divert unused batteries and antifreeze to appropriate recycling facilities as approved by Engineer.

PART 2 **PRODUCTS**

2.1 **MATERIALS AND EQUIPMENT**

- .1 Provide materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division.
- .3 Factory assemble control panels and component assemblies.

2.2 **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 indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

2.3 **WARNING SIGNS**

- .1 As specified and to meet requirements of Electrical Inspection Department and Departmental Representative.
- .2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

2.4 **WIRING TERMINATIONS**

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

2.5 EQUIPMENT IDENTIFICATION

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

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters
- .2 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate and label.
- .5 Identification to be English and French.
- .6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system name and voltage.
- .9 Panelboards: indicate name, voltage, capacity and upstream panel serving mains.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or 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 code: to CSA C22.1, Canadian Electrical Code.

2.7 CONDUIT AND CABLE IDENTIFICATION

- .1 All conduit and boxes to be painted black matte.

2.8 MATERIAL SPECIFIED

- .1 Where additional manufacturers are named under Articles entitled "Approved Manufacturers", the selection of a named manufacturer, in reference to a particular article, shall be the Contractor's responsibility.
- .2 Materials or products specified without the clauses "or approved equal" or "approved manufacturers" shall be supplied as specified and no proposed substitution will be considered.
- .3 Where approvals are granted for the use of other equipment any and all changes or additions required for the installation or operation of the approved equipment will be made by the Contractor at their own expense and no claims will be approved for any such changes, notwithstanding approval of shop drawings. Equipment that is accepted and installed and then does not perform as represented by original submitted data shall be replaced by the Contractor with equipment as specified at no charge to the Owner.
- .4 Trade names are given as a standard of quality and configuration.

2.9 EXAMINATION OF OTHER WORK

- .1 This Division requires the examination of the material and work for all other Divisions under which the work of this Section depends for proper completion. Any defect in work, levels or materials shall be reported to the Engineer. The work of this Division shall not commence until such defects have been corrected. This also applied to existing work installed under other Contracts.

2.10 CUTTING, PATCHING, SLEEVES AND PLATES

- .1 All drilling for hangers, rod, inserts and work of similar nature shall be done by Division 26.

2.11 HANGERS AND EQUIPMENT SUPPORTS

- .1 All equipment provided under the Electrical Division shall be complete with all necessary supports and hangers required for a safe and workmanlike installation and to avoid strain on conduit, etc. Auxiliary supports where required shall be provided under this Division.
- .2 Hammer driven hanger supports, eg. staples, nails, etc. will not be used.
- .3 Paint all hangers, eg. U-bolts, trapeze hangers, etc. BEFORE INSTALLATION. Paint mate black.
- .4 Wire is not an acceptable conduit support.

2.12 TESTING, ACCEPTANCE AND GUARANTEE

- .1 The work of this Contract shall be tested and installed and any defects in operation shall be remedied immediately. Tests required by local authorities shall be the responsibility of the Contractor. When the work is completed, it shall be tested in its entirety and shall be

in good working order before the Departmental Representative's Certificate of Acceptance shall be issued.

- .2 A written guarantee shall be supplied to the Departmental Representative by the Contractor covering the prompt making good of any and all defects in material and workmanship for the period of one (1) year from the date of acceptance and the making good of any such defects shall be completely the responsibility of the Contractor.

PART 3 **Execution**

3.1 **NAMEPLATES AND LABELS**

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

3.2 **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 at following heights unless indicated otherwise.
 - .1 Local switches: 1200 mm.

3.3 **CO-ORDINATION OF PROTECTIVE DEVICES**

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

3.4 **FIELD QUALITY CONTROL**

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.
- .3 Perform tests in Accordance with this section as noted and Section 01 91 13 – Commissioning (Cx) Requirements.
- .4 Conduct and pay for following tests:

- .1 Circuits originating from enclosed circuit breaker.
- .2 Lighting and its control.
- .5 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .6 Insulation resistance testing.
 - .1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Check resistance to ground before energizing and record value.
- .7 Carry out tests in presence of Departmental Representative.
- .8 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

3.5 PAINTING

- .1 Apply at least one coat of matte black corrosion resistant primer paint to ferrous supports and site fabricated work.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes that have been damaged too extensively to be primed and touched up.

3.6 TESTS

- .1 Give 24 h written notice of date for tests. Conceal work only after testing and approval by Consultant. Conduct tests in presence of Consultant. Bear costs including re-testing and making good.
- .2 Equipment: test as specified in relevant sections.
- .3 Prior to tests, isolate all equipment or other parts that are not designed to withstand test pressures or test medium.

3.7 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.
- .3 Complete final cleaning of equipment and work area as acceptable to Engineer.
- .4 At time of final cleaning, clean lighting, reflectors, lenses and other lighting surfaces that have been exposed to construction dust and dirt.

3.8 DRAWINGS, CHANGES, ACCESSIBILITY

- .1 The drawings shall be considered to show the general character and scope of work and not the exact details of the installation.
- .2 The installation shall be complete with all supports and accessories required for a complete operative and satisfactory installation.
- .3 The location, arrangement and connection of equipment and materials as shown on the drawings represent a close approximation to the intent and requirements of the Contract.
- .4 The right is reserved by the Engineer to make reasonable changes required to accommodate conditions arising during the progress of the work. Such changes shall be done at no extra cost to the Owner unless the location, arrangement or connection is more than 3.0 m from that shown.
- .5 Actual location of existing services shall be verified in the field where necessary before work is commenced.
- .6 Changes and modifications necessary to ensure co-ordination and to avoid interference or conflicts with other trades, or to accommodate existing conditions, shall be made at no extra cost to the Owner.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for wire and box connectors.

1.2 **RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results - Electrical.

1.3 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .3 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .4 National Electrical Manufacturers Association (NEMA)

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for stranded copper conductors.
 - .2 Clamp for copper bar.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper bar.
 - .5 Sized for conductors and bars as indicated.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and:

- .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
- .2 Install fixture type connectors and tighten. Replace insulating cap.
- .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.
- .4 Apply coat of zinc joint compound on aluminum conductors prior to connector installation.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.
- .2 Refer to drawings for wiring type required under different applications.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.
 - .2 CAN/CSA-C22.2 No. 131, Type TECK 90 Cable.
 - .3 ULC S139.
 - .4 CSA C22.2 No. 38,124,208
 - .5 UL 2196
 - .6 UL 44.
 - .7 NBCC Section 3.2.6

1.3 **REGULATORY REQUIREMENTS**

- .1 Conform to requirements of Canadian Electrical Code, Part 1.
- .2 Conform to requirements of Fire Resistant Cables in the ULC Online Certification Directory and the Electrical Circuit Protective System Listing in the UL Fire Resistance Directory.
- .3 Furnish products Certified by CSA as suitable for the purpose specified.

PART 2 **PRODUCTS**

2.1 **BUILDING WIRES**

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE.
- .3 Copper conductors: size as indicated, with thermoplastic insulation type TWH rated at 600 V, typically used for insulated ground wires.

PART 3 **EXECUTION**

3.1 **FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

3.2 **GENERAL CABLE INSTALLATION**

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.
- .3 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

3.3 **INSTALLATION OF BUILDING WIRES**

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

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results - Electrical.
- .2 Grounding conductors to be insulated copper, uninsulated where in contact with earth.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)
 - .1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.
- .3 Canadian Standards Association, (CSA)
 - .1 CAN/CSA Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities, where applicable.

PART 2 **PRODUCTS**

2.1 **EQUIPMENT**

- .1 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .2 Insulated grounding conductors: green, type TW.
- .3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors, as required by local authority having jurisdiction.
 - .4 Bonding jumpers, straps.
 - .5 Pressure wire connectors.

PART 3 **EXECUTION**

3.1 **INSTALLATION GENERAL**

- .1 Install complete permanent, continuous grounding system including, conductors, connectors, accessories. Where EMT is used, run insulated copper ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.

- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

3.2 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment including, but not necessarily limited to following list: lighting fixtures, enclosed circuit breaker.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical and Section 01 19 13 – Commissioning (Cx) Requirements.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

END OF SECTION

PART 1 **GENERAL (NOT APPLICABLE)**

PART 2 **PRODUCTS**

2.1 **SUPPORT CHANNELS**

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

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
- .2 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .3 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .4 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .5 Do not use wire lashing, wood blocking, plastic strap or perforated strap to support or secure raceways or cables.
- .6 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .7 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
- .8 Paint all rods, angles, channels, etc. matte black before installation.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results – Electrical.
- .2 Section 26 05 29 – Hangers and Supports for Electrical Systems.
- .3 Section 26 05 34 – Conduits, Conduit Fastenings and Fittings.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1.

PART 2 **PRODUCTS**

2.1 **OUTLET AND CONDUIT BOXES GENERAL**

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.

2.2 **CONDUIT BOXES**

- .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.3 **FITTINGS - GENERAL**

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 Provide correct size of openings in boxes for conduit, connections. Reducing washers are not allowed.
- .4 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .5 Identify systems for outlet boxes as required.
- .6 Paint all boxed matte black prior to installation.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.
 - .2 CSA C22.2 No. 45, Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83, Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.

1.2 **SUBMITTALS**

- .1 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .2 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

PART 2 **PRODUCTS**

2.1 **CONDUITS**

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

2.2 **CONDUIT FASTENINGS**

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- .2 Channel type supports for two or more conduits at 1.5 m oc.

2.3 **CONDUIT FITTINGS**

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

- .2 Factory "ells" where 90°, 45 ° or 22.5 ° bends are required for 25 mm and larger conduits.
- .3 Ensure conduit bends other than factory “ells” are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.
- .4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 FISH CORD

- .1 Polypropylene.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the CSA/UL certification of these components.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .3 Surface mount conduits as indicated.
- .4 Use electrical metallic tubing (EMT) except as otherwise noted.
- .5 Minimum conduit size for lighting and power circuits: 21 mm. 16 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.
- .6 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .7 Mechanically bend steel conduit over 21 mm dia.
- .8 Install fish cord in empty conduits.
- .9 All conduits and associated fittings to be painted matte black prior to installation.
- .10 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .11 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Group conduits wherever possible on suspended channels.
- .3 Do not pass conduits through structural members . No cutting/drilling of building structure is permitted.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools, and equipment.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 26 05 00 – Common Work Results - Electrical.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.55, Special Use Switches.
 - .4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.3 **SUBMITTALS**

- .1 Product Data: For each type of product.

1.4 **CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 **PRODUCTS**

2.1 **MANUFACTURERS**

- .1 Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; Wiring Device-Kellems (Hubbell) or a comparable product by one of the following:
 - .1 Cooper Wiring Devices, Inc.; Division of Cooper Industries, Inc.
 - .2 Leviton Manufacturing Co., Inc.
 - .3 Pass & Seymour/Legrand (Pass & Seymour).
- .2 Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- .1 Wiring Devices, Components, and Accessories: Listed and labeled to CSA, and marked for intended location and application.

2.3 TOGGLE SWITCHES

- .1 Comply with NEMA WD 1, CSA C22.2 No.111 and CSA C22.2 No. 55.
- .2 Switches, 120 V, 20 A:
 - .1 Single Pole:
 - .1 Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; 1221 or equivalent.

2.4 WALL PLATES

- .1 Single and combination types shall match corresponding wiring devices.
 - .1 Plate-Securing Screws: Metal with head color to match plate finish.
 - .2 Material for Finished Spaces: 1 mm thick, satin-finished, Type 302 stainless steel. Painted matte black.
 - .3 Material for Unfinished Spaces: Galvanized steel. Painted matte black.
- .2 Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.
- .3 Hubbell MX3200(vertical) or MX3300(horizontal) or equivalent.

2.5 FINISHES

- .1 Device Color:
 - .1 Wiring Devices Connected to Normal Power System: matte black unless otherwise indicated or required by CSA or device listing.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Comply with CSA C22.1, including mounting heights listed in that standard, unless otherwise indicated.
- .2 Coordination with Other Trades:
 - .1 Protect installed devices and their boxes.
 - .2 Keep outlet boxes free of debris that may contaminate the raceway system, conductors, and cables.
- .3 Conductors:

- .1 Do not strip insulation from conductors until right before they are spliced or terminated on devices.
- .2 Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
- .3 The length of free conductors at outlets for devices shall meet provisions of CSA C22.1, Article 300, without pigtails.
- .4 Device Installation:
 - .1 Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 - .2 Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - .3 Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - .4 Connect devices to branch circuits using pigtails that are not less than 152 mm in length.
 - .5 When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 - .6 Use a torque screwdriver when a torque is recommended or required by manufacturer.
 - .7 When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - .8 Tighten unused terminal screws on the device.
 - .9 When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
 - .10 Install single throw switches in “UP” position when switch closed.
- .5 Device Plates: Do not use oversized or extra-deep plates.
- .6 Arrangement of Devices: Unless otherwise indicated, surface mount, with long dimension vertical. Group adjacent switches under single, multigang wall plates.

3.2 FIELD QUALITY CONTROL

- .1 Wiring device will be considered defective if it does not pass tests and inspections.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Related Documents:
 - .1 Drawings and general provisions of the contract apply to this Section.
 - .2 Review these documents for coordination with additional requirements and information that apply to work under this Section.
- .2 Section Includes:
 - .1 Interior luminaires and accessories.
 - .2 Light Emitting Diode (LED) fixtures and drivers
 - .3 Luminaire accessories.

1.2 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41, Surge Voltages in Low-Voltage AC Power Circuits.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.
- .5 Consortium for Energy Efficiency (CEE) [www.cee1.org].
- .6 IES – Illuminating Engineering Society.
- .7 UL – Underwriters Laboratories:
 - .1 UL 924

1.3 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.

1.4 **SUBMITTALS**

- .1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

- .2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables.
- .3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Quality assurance submittals: provide the following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and maintenance schedule.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Divert unused metal materials from landfill to metal recycling facility.

1.6 ACCEPTABLE PRODUCTS

- .1 Luminaires described on the drawings identify quality, performance criteria and other parameters, as indicated for this project. Named fixtures are acceptable with modifications and accessories, as indicated.
- .2 Fixtures from other manufacturers may be acceptable provided:
 - .1 Appearance and lighting performance are similar.
 - .2 Quality is equal or better.
 - .3 LED and driver criteria remain the same.
 - .4 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.

PART 2 PRODUCTS

2.1 GENERAL

- .1 Descriptions, type letters, manufacturers' names and general characteristics are shown on the drawings. Manufacturers' names noted are for defining quality of construction only and do not limit other manufacturers' products.
- .2 Special Adapters, Plates, Brackets, and Anchors: Provide where required by construction features of the building to suitably mount lighting fixtures; all such appurtenances and mounting methods approved by the Engineer prior to fabrication and installation.

- .3 Lighting fixtures replacement shall not require removal or alteration to a permanent section of the structure i.e. permanent ceiling. Fixtures shall be easily replaceable otherwise a different type of fixture should be provided.

2.2 LAMPS

- .1 LED lamp-life hour shall be 50,000 hours.

2.3 DRIVERS

- .1 LED driver shall be installed with the fixture body where possible. Provide an electrical enclosure where remote mounting is required.
- .2 Wiring inside enclosure shall comply 600V/90 degrees rating or higher.
- .3 LED driver shall comply with UL standard UL1012.
- .4 LED driver shall have Class A sound rating.
- .5 LED driver shall be CSA certified for use in a dry or damp location.
- .6 LED driver shall tolerate sustained open circuit and short circuit output conditions without damage.

2.4 LIGHT EMITTING DIODE (LED) FIXTURES

- .1 Luminaire shall have door frame and lens with LED arrays and integral airflow ventilation system.
- .2 The lighting system shall consist of the type and manufacturer as shown on the drawings or approved equal. If other than fixture shown is submitted complete illumination calculations are required to show equality.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- .1 Fixture Location: Locations shown are approximate only. Install at locations as required to coordinate with architectural features. Exact final locations to be coordinated on site with Departmental Representative.
- .2 Fixture Supports: Where no specific method is shown or specified use steel channel sections, concrete anchors, steel rods and appropriate miscellaneous fittings. Fixture to be surface mounted to structural wood beam using wood screws of appropriate size.

3.2 INDOOR INSTALLATION

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

- .2 Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- .3 Install accessories furnished with each luminaire.
- .4 Connect luminaires to branch circuit provided as indicated on the drawings.
- .5 Make wire connections within fixtures using solderless connectors as specified; automatic splicing devices or connectors will not be allowed. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- .6 Bond products and metal accessories to branch circuit equipment grounding conductor.

3.3 ADJUSTING

- .1 Aim and adjust luminaires to provide illumination levels and distribution indicated on the drawings.

3.4 CLEANING

- .1 Clean electrical parts to remove conductive and deleterious materials.
- .2 Remove dirt and debris from enclosure.
- .3 Clean lighting control elements, fixture interiors and exposed exterior surfaces thoroughly before requesting final inspection.
- .4 Clean finishes and touch up damage.

3.5 WIRING

- .1 Connect luminaires to lighting circuits using methods as detailed or described.

3.6 FIELD QUALITY CONTROL

- .1 Operate each luminaire after installation and connection. Inspect for improper connections and operation.
- .2 Measure and record illumination levels of indoor spaces verify conformance with performance requirements.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 Work under this Section includes:
 - .1 Trenching using hand tools within the building for the purpose of installing drainage pipe.
 - .2 Trenching outside the building for the purpose of installing drainage pipe.
 - .3 Excavation and trenching outside the building for the purpose of shaping a swale and installation of drainage pipe.
 - .4 All trenching and excavations to be done by PCA.

1.2 **MEASUREMENT PROCEDURES**

- .1 Excavated materials will be measured in cubic metres in their original location.
 - .1 Common excavation quantities measured will be actual volume removed within following limits:
 - .1 Width for trench excavation as indicated.
 - .2 Width for excavation for structures as indicated.
 - .3 Depth from ground elevation immediately prior to excavation, to elevation as directed by PCA.
 - .2 Shoring, bracing, cofferdams, underpinning and de-watering of excavation are the responsibility of the Contractor and will not be measured separately for payment.
 - .3 Backfilling to authorized excavation limits will be required as per drawings.
 - .4 Placing and spreading of topsoil will be required as per drawings.

1.3 **REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63-2002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 DEFINITIONS

- .1 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 mm in any dimension.
- .2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .4 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .5 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM C136: Sieve sizes to CAN/CGSB-8.1.

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100

0.02 mm	10 - 80
0.005 mm	0 - 45

- .3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .6 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 LEED Submittals:
 - .1 Submit erosion and sedimentation control plan for Credit SSp1 in accordance with LEED Canada-NC.
- .3 Quality Control: in accordance with Section 01 45 00- Quality Control:
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
 - .2 Submit for review by Departmental Representative proposed dewatering methods as described in PART 3 of this Section.
 - .3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
 - .4 Submit to Departmental Representative written notice when bottom of excavation is reached.
 - .5 Submit to Departmental Representative results and report as described in PART 3 of this Section.
- .4 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: [location plan of relocated and abandoned services, as required] [location plan of existing utilities as found in field] [clearance record from utility authority].
- .5 Samples:
 - .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
 - .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of all materials and provide access for sampling.
 - .3 Submit samples of type of fill specified and representative samples of excavated material.

1.6 QUALITY ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Shop drawings

- .1 Submit design, supporting data, and shop drawings at least 2 weeks prior to beginning Work.
- .3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Newfoundland and Labrador, Canada.
- .4 Keep design and supporting data on site.
- .5 Engage services of qualified professional Engineer who is registered or licensed in Newfoundland and Labrador, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
- .6 Do not use soil material until approved by Departmental Representative.
- .7 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06- Health and Safety Requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling/reuse in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
- .2 Divert excess aggregate materials from landfill to local quarry for reuse as directed by Departmental Representative.

1.8 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations or as directed: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.
 - .6 Confirm locations of buried utilities by careful test excavations.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing, re-routing. [Costs for such Work to be paid by Departmental Representative].
 - .9 Record location of maintained, re-routed and abandoned underground lines.
 - .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:

- .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, survey bench marks, walk ways and monuments which may be affected by Work.
- .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative
- .3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Type 1 and Type 2 fill: properties to Section [31 05 16- Aggregate Materials] and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to [ASTM C117] [ASTM C136]. Sieve sizes to [CAN/CGSB-8.1] [CAN/CGSB-8.2].
 - .3 Table:

Sieve Designation	% Passing	
Type 1	Type 2	
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

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

PART 3 **EXECUTION**

3.1 **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.3 PREPARATION/PROTECTION

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

3.4 STRIPPING OF TOPSOIL

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

3.5 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act for the Province of Newfoundland and Labrador.
 - .1 Where conditions are unstable, Departmental Representative to verify and advise methods.

- .2 Obtain permit from authority having jurisdiction for temporary diversion of water course.
- .3 Construct temporary Works to depths, heights and locations as approved by Departmental Representative.
- .4 During backfill operation:
 - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .6 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses as directed by Departmental Representative.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for approval Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.8 EXCAVATION

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.

- .3 Remove demolished foundations and rubble, masonry, concrete, and other obstructions encountered during excavation in accordance with Section 02 41 13- Selective Site Demolition.
- .4 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .8 Restrict vehicle operations directly adjacent to open trenches.
- .9 Dispose of surplus and unsuitable excavated material in location approved by PCA.
- .10 Do not obstruct flow of surface drainage or natural watercourses.
- .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .12 Notify Departmental Representative when bottom of excavation is reached.
- .13 Obtain Departmental Representative approval of completed excavation.
- .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .15 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.
- .16 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- .17 Install geotextiles as required.

3.9 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below.
 - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.
 - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100% of corrected maximum dry density.

- .3 Place unshrinkable fill in areas as indicated.

3.10 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .4 Removal of concrete formwork.
 - .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Place layers simultaneously on both sides of installed Work to equalize loading.
 - .3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative:
 - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
- .6 Consolidate and level unshrinkable fill with internal vibrators.

3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris.
- .2 Replace topsoil as directed by Departmental Representative.
- .3 Reinstall lawns to elevation which existed before excavation.
- .4 Clean and reinstall areas affected by Work as directed by Departmental Representative.
- .5 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Appendix A

FEATURES & SPECIFICATIONS

INTENDED USE — The CLX is a linear lighting solution that is available in multiple lengths, lumen packages and distributions. Designed for versatility, the CLX can address virtually any indoor lighting need. The CLX is also offered in standard and high efficacy configurations and capable of being continuous row mounted or installed as a stand-alone fixture. Ideal for uplight and downlight in commercial, retail, manufacturing, warehouse, and display applications. **Certain airborne contaminants can diminish the integrity of acrylic and/or polycarbonate.** [Click here for Acrylic-Polycarbonate Compatibility table for suitable uses.](#)

CONSTRUCTION — Channel and cover are formed from code-gauge cold-rolled steel.

Finish: Paint options include high-gloss, baked white polyester (WH), galvanized (GALV), matte black (MB) and smoke gray (SKGY). Five-stage iron phosphate pre-treatment ensures superior paint adhesion and rust resistance. Housing and lens endcaps are injection molded plastic to provide a more architectural look and feel. The endcaps come standard with a knock out for continuous mounting but can be ordered without.

OPTICS — Offered in lens and less lens configurations. Provides a choice of optical distributions including, wide, narrow, and aisle.

ELECTRICAL — Utilizes high-output LEDs integrated on a two-layer circuit board, ensuring cool-running operation. Optional internal pluggable wiring harness for reduced labor cost in row mounting applications. (See PLR_ ordering information on page 8.) Electronic LED driver is rated for 75 input watts maximum (see Operational Data on page two for actual wattage consumption), multi-volt input and 0-10V dimming standard. This fixture is designed to withstand a maximum line surge of 2.5kV at 0.75kA combination wave for indoor locations, for applications requiring higher level of protection additional surge protection must be provided.

Enabled with Atrius™ - The CLX is enabled with Atrius™, making it part of the Atrius™ Sensory Network and ready to deliver valuable data and connectivity to the Atrius™ Platform. For more information concerning Atrius™ solutions, please refer to www.acuitybrands.com/atrus.

LEDs provide nominal 80 CRI or 90CRI at 3000 K, 3500 K, 4000 K, or 5000 K.

Lumen output up to 2,500 lumens per foot.

INSTALLATION — Fixture may be ceiling or wall mounted (with or without THCLX hanger or angle mounted with CLXANGBRT), pendant or stem mounted with appropriate mounting options.

LISTINGS — CSA certified to US and Canadian safety standards. For use in damp locations between -4°F (-20°C) and 104°F (40°C). Optional High Ambient (HA) ranging to 122°F(50°C) available on certain lumen packages.

WARRANTY — 5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Stock configurations are offered for shorter lead times:

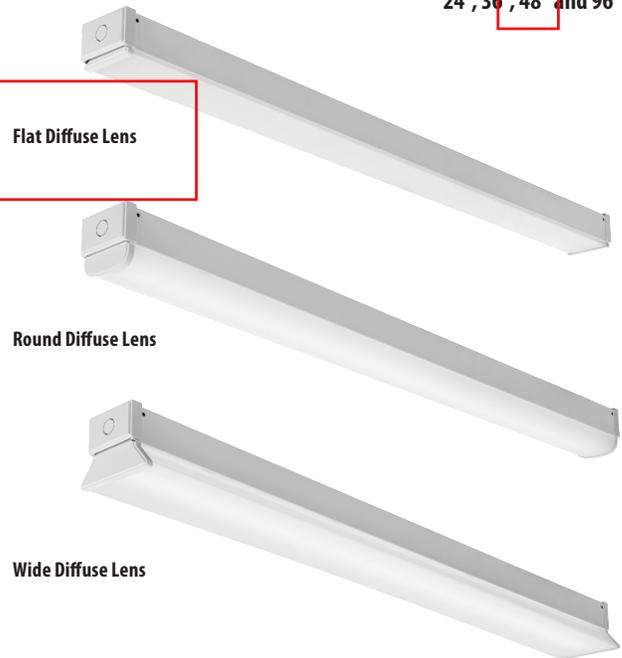
Stock Part Number	UPC
CLX L48 3000LM SEF FDL MVOLT GZ10 40K 80CRI WH	00191723525816
CLX L48 3000LM SEF FDL MVOLT GZ10 50K 80CRI WH	00191723525885
CLX L48 5000LM SEF FDL MVOLT GZ10 40K 80CRI WH	00191723525939
CLX L48 5000LM SEF FDL MVOLT GZ10 50K 80CRI WH	00191723525908
CLX L96 6000LM SEF FDL MVOLT GZ10 40K 80CRI WH	00191723525861
CLX L96 6000LM SEF FDL MVOLT GZ10 50K 80CRI WH	00191723525915
CLX L96 10000LM SEF FDL MVOLT GZ10 40K 80CRI WH	00191723525922
CLX L96 10000LM SEF FDL MVOLT GZ10 50K 80CRI WH	00191723525830
CLX L48 3000LM SEF RDL MVOLT GZ10 40K 80CRI WH	00191723525960
CLX L48 3000LM SEF RDL MVOLT GZ10 50K 80CRI WH	00191723525892
CLX L48 5000LM SEF RDL MVOLT GZ10 40K 80CRI WH	00191723525854
CLX L48 5000LM SEF RDL MVOLT GZ10 50K 80CRI WH	00191723525946
CLX L96 6000LM SEF RDL MVOLT GZ10 40K 80CRI WH	00191723525878
CLX L96 6000LM SEF RDL MVOLT GZ10 50K 80CRI WH	00191723525823
CLX L96 10000LM SEF RDL MVOLT GZ10 40K 80CRI WH	00191723525953
CLX L96 10000LM SEF RDL MVOLT GZ10 50K 80CRI WH	00191723525847

Catalog Number
Notes
Type

LED Linear

CLX

24", 36", 48" and 96" Lengths



ENABLED WITH ATRIOUS™

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® or XPoint™ Wireless control networks marked by a **shaded background***

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

CLX LED Linear

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: CLX L48 5000LM SEF WDL MVOLT GZ10 40K 80CRI WH

Series	Length	Nominal lumens ¹	Performance package	Louver	Lens
CLX LED linear	L24 24" ^{11,12,3}	1500LM 1,500 lumens	SEF Standard efficiency ⁴	(Blank) Less louver	L/Lens Less lens ⁶
		2000LM 2,000 lumens	HEF Premium efficiency	SBLW Straight blade louver, white ⁵	FDL Flat diffuse ^{7,8,9}
		2500LM 2,500 lumens		SBLMB Straight blade louver, matte black ⁵	RDL Round diffuse ^{7,8,9}
		3500LM 3,500 lumens		SBLGV Straight blade louver, galvanized ⁵	WDL Wide diffuse ^{7,8}
		4500LM 4,500 lumens		SBLSKGY Straight blade louver, smoke gray ⁵	
		5000LM 5,000 lumens			
	L36 36" ^{11,12,3}	2250LM 2,250 lumens			
		3000LM 3,000 lumens			
		3750LM 3,750 lumens			
		5250LM 5,250 lumens			
		6750LM 6,750 lumens			
		7500LM 7,500 lumens			
	L48 48"	3000LM 3,000 lumens			
		4000LM 4,000 lumens			
		5000LM 5,000 lumens			
		7000LM 7,000 lumens ³			
9000LM 9,000 lumens ³					
10000LM 10,000 lumens ^{1,3}					
L96 96"	6000LM 6,000 lumens				
	8000LM 8,000 lumens				
	10000LM 10,000 lumens				
	14000LM 14,000 lumens ³				
	18000LM 18,000 lumens ³				
	20000LM 20,000 lumens ^{1,3}				

Distribution	Voltage	Driver ¹¹	Color temperature	Coloring rendering index
(Blank) General	MVOLT 120-277V	277 277V	30K 3000 K	80CRI 80 CRI
ND Narrow ⁸	120 120V	347 347V ¹⁰	35K 3500 K	90CRI 90 CRI
WD Wide ⁸	208 208V	480 480V ¹⁰	40K 4000 K	
AD2 Aisle, 24° off center ⁸	240 240V		50K 5000 K	

Options	Finish
PS1050 Emergency battery pack, not available with BGT ^{15,16}	WH White
BGTD Generator transfer device, not available with PS1050 ¹⁶	GALVW Galvanized with white lens end caps
OCS 5', 18/3 Reloc selectable One Pass cable ¹⁷	GALVB Galvanized with black lens end caps
HA Hgh ambient, for use in ambient temperatures up to 50°C	MB Matte black
EPNKO Decorative endplate, no knock out	SKGYW Smoke gray with white lens end caps
OUTCTR Wiring leads pulled through back center of fixture	SKGYB Smoke gray with black lens end caps
OUTEND Wiring leads pulled through end of fixture	
CS1W Staight blade plug, 120V ¹⁷	
CS3W NEMA twist-lock plug, 120V ¹⁷	
CS7W Staight blade plug, 277V ¹⁷	
CS11W NEMA twist-lock plug, 277V ¹⁷	
CS25W NEMA twist-lock plug, 347V ¹⁷	
CS97W NEMA twist-lock plug, 480V ¹⁷	
CS93W 600V SE00W white cord, no plug (no voltage required)	
CS6G16STOWD5D 6' white cord, 16/5, no plug, includes low voltage dimming wires	
PLR___ Plug-in wiring, see page 9 for ordering information	
PLR1LVG Plug-in wiring, low voltage dimming	
RRL___ RELOC®-ready luminaire. See page 8 for ordering information	
SPD Surge protection device, provides up to 6kV protection ¹⁷	
Individual controls:	
MSD7 PIR integral occupancy sensor ¹⁸	
MSDPDT7 PDT 7 dual technology integral occupancy control ¹⁸	
MSD7ADC PIR integral occupancy sensor with automatic dimming control photocell ¹⁸	
MSDPDT7ADC PDT integral occupancy sensor with automatic dimming control photocell ¹⁸	
Xpoint™ Wireless:	
XAD XPoint™ Wireless 0-10V relay, internal, lower max ambient ¹⁹	
XAD924 XPoint™ Wireless 0-10V relay, internal, lower max ambient with emergency relay (UL924 compliant) ¹⁹	
Enabled with Atrius™:	
AE1CD Atrius™ enabled, Visible Light Communication, Bluetooth (registered logo) beacons and network, digital driver ^{8,8}	
nLight® Wired Networking:	
N100 nLight® without lumen management	
NES7 nLight® nES 7 PIR integral occupancy sensor	
NESPDT7 nLight® nES PDT 7 dual technology integral occupancy control	
NES7ADCX nLight® nES 7 ADCX PIR integral occupancy sensor with automatic dimming photocell	
NESPDT7ADCX nLight® nES PDT 7 dual technology integral occupancy sensor with automatic dimming photocell	
nLight® Wireless Networking:	
RES7N nLight® AIR PIR integral occupancy sensor with automatic dimming photocell for networking capabilities ⁹	
nLight® Wireless Zone:	
RES7Z nLight Air PIR integral occupancy sensor with automatic dimming photocell for zone control ⁹	

See Accessories and footnotes on next page



Accessories: Order as separate catalog number.					
ZACVH	Aircraft cable 120" (one pair)	THCLX ____	Tong hanger (Must specify color) (one pair)	CLXRW96	Wide decorative 96" reflector
ZAC120	One adjustable aircraft cable with canopy 120"	CLXANGBKT ____	Angle bracket, (one pair)	CLXRWU24	Wide decorative 24" reflector with uplight
ZACFP120	One adjustable aircraft cable with feed (3 conductor) and canopy, 120"	HC36	Hanger chain, 36" (one pair)	CLXRWU36	Wide decorative 36" reflector with uplight
ZACFPD120	One adjustable aircraft cable with feed (5 conductor) and canopy 120"	LSXR	Sensor Switch ® LSXR occupancy sensor	CLXRWU48	Wide decorative 48" reflector with uplight
ZAC240	One adjustable aircraft cable with canopy 240"	NPP16D	nLight® switching/dimming module	CLXRWU96	Wide decorative 96" reflector with uplight
ZACFP240	One adjustable aircraft cable with feed (3 conductor) and canopy, 240"	NPP16DER	nLight® switching/dimming module with emergency relay	CLXRN24	Narrow 24" reflector ²⁰
ZACFPD240	One adjustable aircraft cable with feed (5 conductor) and canopy 240"	XPA CMRBO	XPoint™ Wireless 0-10V relay, external, 55°C max ambient	CLXRN36	Narrow 36" reflector ²⁰
SQ_	Stem kit, 2" increments up to 48"	CLXRW24	Wide decorative 24" reflector	CLXRN48	Narrow 48" reflector ²⁰
		CLXRW36	Wide decorative 36" reflector	CLXRN96	Narrow 96" reflector ²⁰
		CLXRW48	Wide decorative 48" reflector	WGCLX24	24" wireguard, white ²¹
				WGCLX36	36" wireguard, white ²¹
				WGCLX48	48" wireguard, white, 96" fixture requires two ²¹

Notes

- Not available with EOHN or AE1CD options.
- Not available with OUTCTR option.
- Not available with HA option.
- Not available with EZ1 when ordered with L24 with 5000LM or L36 with 7500LM.
- Only available with L24 when ordered with 1500LM or 2000LM and with GZ10 driver. Not for use with THCLX, CLXANGBKT or WGCLX accessories. Not available L/LENS or with RDL lens options.
- Not available with EOHN or AE1CD.
- Only available with general distribution.
- Not available with CLXRN accessories.
- Not available with EOHN or AE1CD.
- Voltage selected utilizes a step-down transformer. Not available with L24 when ordered with N100.
- When continuous row mounting, fixtures must all have the same driver selection.
- Not available with N100, Enabled with Atrius, Individual controls, nLight wired networking, nLight wireless networking, nLight wireless zone control options.
- Not available with HA options.
- Requires SPD option. Not available with HA option.
- Requires SPD option.
- Must specify voltage.
- Required with PS1050, BGTD, XAD or XAD924 options.
- Requires EZ1 driver.
- Not available with L96 14000LM, 18000LM, or 20000LM
- For use with L/LENS only.
- Not for use with CLX reflector accessories.

Enabled with Atrius™ Notes

- A Not available with L48 10000LM, L96 20000LM, L24 or L36. Not available with Individual controls, nLight wired networking, nLight wireless networking, nLight wireless zone control options. Not available with SBL lovers or WGCLX_ wire guard accessories.
- B Available with EOHN driver only.

POWER SENTRY EMERGENCY BATTERY PACKS

PS1050	https://www.acuitybrands.com/products/detail/369448/Power-Sentry/PS1050/Reduced-Profile-LED-Emergency-Battery-Pack	Factory installable
PS1055LCP	https://www.acuitybrands.com/products/detail/755258/Power-Sentry/PS1055LCP-Battery-Pack/Constant-Power-Field-Installable-LED-Emergency-Driver	Field installable, remote mount only
PS1555LCP	https://www.acuitybrands.com/products/detail/755258/Power-Sentry/PS1055LCP-Battery-Pack/Constant-Power-Field-Installable-LED-Emergency-Driver	Field installable, remote mount only

EMERGENCY LUMENS

Efficiency Package	SEF	HEF
PS1050	1400	1500
PS1055LCP	1400	1500
PS1555LCP	2000	2100

Note: For emergency lumen output of specific model, please consult factory.

CLX OPERATIONAL DATA

	Length	Nominal lumen package	Performance package	CRI	Delivered Lumens				Wattage
					Color Temperature				
					3000K	3500K	4000K	5000K	
FDL	L24	2500LM	SEF	80	2307	2372	2437	2495	18.41
		5000LM	SEF	80	4722	4855	4989	5107	41.48
	L36	3750LM	SEF	80	3536	3636	3736	3825	26.47
		7500LM	SEF	80	6652	6840	7027	7194	62.6
	L48	5000LM	SEF	80	4451	4576	4702	4813	34.8
		10000LM	SEF	80	9082	9338	9594	9822	73.37
L96	10000LM	SEF	80	8649	8893	9137	9354	66.47	
	20000LM	SEF	80	17976	18484	18991	19442	146.83	
RDL	L24	2500LM	SEF	80	2374	2441	2508	2568	18.41
		5000LM	SEF	80	4860	4997	5135	5256	41.48
	L36	3750LM	SEF	80	3640	3742	3845	3936	26.47
		7500LM	SEF	80	6846	7040	7233	7404	62.6
	L48	5000LM	SEF	80	4581	4710	4839	4954	34.8
		10000LM	SEF	80	9347	9611	9875	10109	73.37
L96	10000LM	SEF	80	8902	9153	9404	9628	66.47	
	20000LM	SEF	80	18502	19024	19546	20010	146.83	
WDL	L24	2500LM	SEF	80	2405	2473	2541	2601	18.41
		5000LM	SEF	80	4924	5063	5201	5325	41.48
	L36	3750LM	SEF	80	3687	3791	3895	3988	26.47
		7500LM	SEF	80	6936	7131	7327	7501	62.6
	L48	5000LM	SEF	80	4640	4771	4902	5019	34.8
		10000LM	SEF	80	9469	9736	10003	10241	73.37
L96	10000LM	SEF	80	9018	9272	9527	9753	66.47	
	20000LM	SEF	80	18743	19272	19801	20271	146.83	

LUMENS VS. AMBIENT TEMPERATURE

Ambient °C	Ambient °F	Lumen Multiplier
0	32	1.013
5	41	1.012
10	50	1.011
20	68	1.005
25	77	1
30	86	0.995
35	95	0.989
40	104	0.983
45	113	0.979
50	122	0.971
55	131	0.965

CLX CHARACTERISTICS

Nominal Lumen Package	Length	Wattage								Length	Width	Depth	Comparable Light Source
		Standard efficiency				High efficiency							
		120V	277V	347V	480V	120V	277V	347V	480V				
Dimensions are shown in inches													
2500LM	24"	19.9	19.9	25.9	25.9	18.5	18.5	24.5	24.5	24	3.5	3.75	1-lamp 32WT8, 1-lamp 54W T5HO, 50W HID
5000LM	24"	41.9	41.9	47.9	47.9	37.9	37.9	43.9	43.9	24	3.5	3.75	2-lamp 32WT8, 1-lamp 54W T5HO, 70W HID
3750LM	36"	28.1	28.1	34.1	34.1	27.0	27.0	33.0	33.0	36	3.5	3.75	1-lamp 32WT8, 1-lamp 54W T5HO, 50W HID
7500LM	36"	62.9	62.9	68.9	68.9	56.8	56.8	62.8	62.8	36	3.5	3.75	2-lamp 32WT8, 1-lamp 54W T5HO, 70W HID
5000LM	48"	35.4	35.4	41.4	41.4	32.9	32.9	38.9	38.9	48	3.5	3.75	2-lamp 32WT8, 1-lamp 54W T5HO, 70W HID
10000LM	48"	77.1	77.1	83.1	83.1	70.4	70.4	76.4	76.4	48	3.5	3.75	3-lamp 32WT8, 2-lamp 54W T5HO, 100W HID
10000LM	96"	70.8	70.8	76.8	76.8	65.8	65.8	71.8	71.8	96	3.5	3.75	3-lamp 32WT8, 2-lamp 54W T5HO, 100W HID
20000LM	96"	154.2	154.2	160.2	160.2	140.8	140.8	146.8	146.8	96	3.5	3.75	6-lamp 32WT8, 4-lamp 54W T5HO, 200W HID

PROJECTED LUMEN MAINTENANCE

CLX						
Operating hours	0	15,000	30,000	45,000	60,000	100,000
Lumen maintenance factor	1	0.971	0.944	0.918	0.893	0.83

AMBIENT TEMPERATURE RATINGS

	Driver Lumen package Type	Driver	THCLX	Direct Surface	HEF	Direct Surface	Driver	Direct Surface	THCLX	Suspended 18"	Xpoint/BGTD Direct Surface	PS1050 Suspended
L24	1500LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	35C	35C	25C
	2000LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	35C		
	2500LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	35C		
	3000LM	GZ10	40C	40C		N/A	EZ1 or EOHN	40C	40C	40C		
	4500LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	40C		
	5000LM	GZ10	40C	40C		N/A	EZ1 or EOHN	25C	30C	35C		
L36	2250LM	GZ10	40C	40C		N/A	EZ1 or EOHN	40C	40C	40C		
	3000LM	GZ10	40C	40C		N/A	EZ1 or EOHN	40C	40C	40C		
	3750LM	GZ10	40C	40C		N/A	EZ1 or EOHN	40C	40C	40C		
	5250LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	40C		
	6750LM	GZ10	40C	30C		N/A	EZ1 or EOHN	35C	35C	40C		
	7500LM	GZ10	40C	30C		N/A	EZ1 or EOHN	25C	30C	35C		
L48	3000LM	GZ10	40C	40C	GZ10	50C	EZ1 or EOHN	40C	40C	40C		
	4000LM	GZ10	40C	40C	GZ10	50C	EZ1 or EOHN	40C	40C	40C		
	5000LM	GZ10	40C	40C	GZ10	50C	EZ1 or EOHN	35C	35C	40C		
	7000LM	GZ10	40C	30C		N/A	EZ1 or EOHN	35C	35C	40C		
	9000LM	GZ10	40C	30C		N/A	EZ1 or EOHN	25C	30C	35C		
	10000LM	GZ10	40C	30C		N/A	EZ1 or EOHN	25C	30C	35C		
L96	6000LM	GZ10	40C	40C	GZ10	50C	EZ1 or EOHN	35C	35C	40C		
	8000LM	GZ10	40C	30C	GZ10	50C	EZ1 or EOHN	35C	35C	40C		
	10000LM	GZ10	40C	30C	GZ10	50C	EZ1 or EOHN	25C	30C	35C		
	14000LM	GZ10	40C	40C		N/A	EZ1 or EOHN	35C	35C	40C		
	18000LM	GZ10	40C	30C		N/A	EZ1 or EOHN	25C	30C	35C		
	20000LM	GZ10	40C	30C		N/A	EZ1 or EOHN	25C	30C	35C		

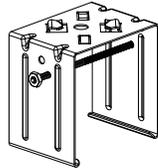
DIMENSIONS

All dimensions are in inches (centimeters) unless otherwise indicated.
Dimensions may vary with options or accessories.

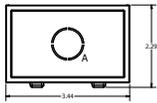
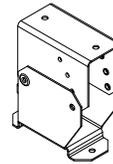
PALLET DIMENSIONS

Length	Approx Weight	Fixtures per pallet	Pallet Dims (L X W X H)
L24	4 lb	100	54x46x37
L36	5 lb	80	54x46x37
L48	7.5 lb	64	54x46x37
L96	14 lb	64	98x46x37

THCLX - SHIPS TWO PER ORDER,
UTILIZES A #8 HEX HEAD SCREW AND NUT
FIXTURE SITS 1.3 INCHES FROM STRUCTURE WHEN MOUNTED

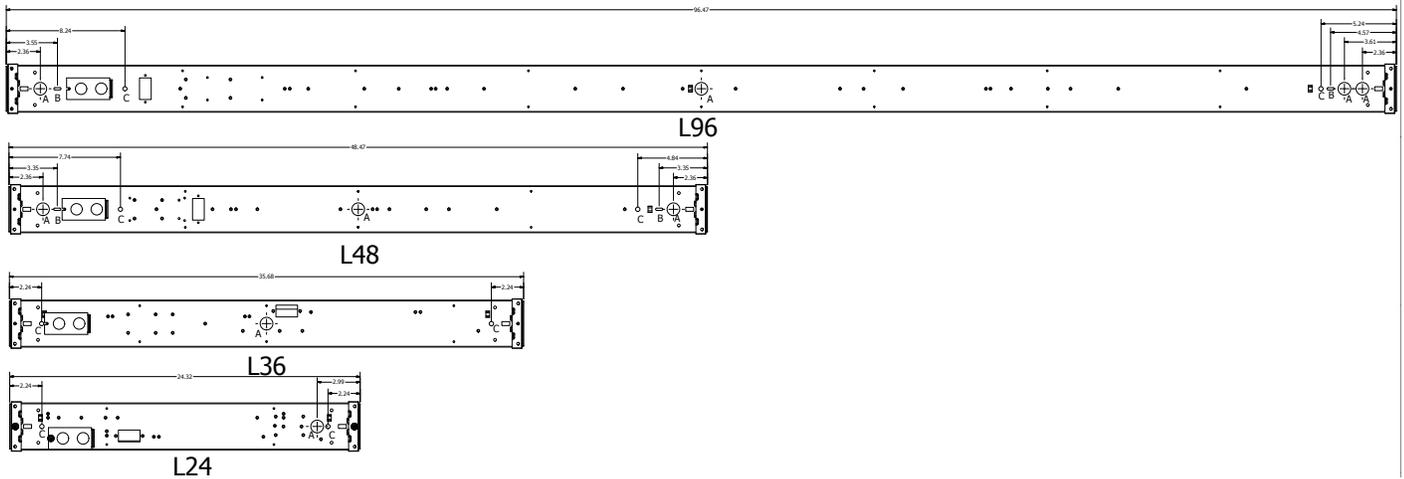


CLXANGBKT - SHIPS TWO PER ORDER
HOLES TO MOUNTING STRUCTURE ARE 0.175" DIA, 2.5" APART
FIXTURE SITS APPROXIMATELY 3.5" FROM STRUCTURE
WHEN MOUNTED HORIZONTAL TO STRUCTURE



INTEGRATED SENSOR ADDS 4.75 INCHES TO STANDALONE FIXTURE LENGTH
HOUSING END CAP ADDS 0.236 INCHES TO FIXTURE LENGTH PER SIDE

A - 7/8" KNOCK OUT
B - 0.5" by 0.16" SLOT
C - 0.3" DIA HOLE

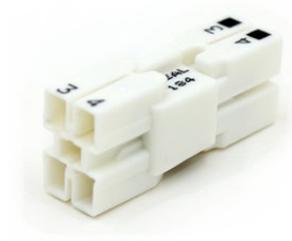


PHOTOMETRICS

See www.lithonia.com.

RRL - RELOC®-Ready Luminaire

- RRL connectors can be used with Quick-Flex®, System 820 and OnePass® systems.
- Load side of connector factory installed to luminaire.
- 4-pole mating connector with push-in terminations allows for simple installation.
- Touch-safe design on both halves meets UL/CSA requirement.
- Wiping contact design allows safe disconnect under load.



ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: RRLA

Series	Wiring instructions
RRL RELOC®-ready luminaire	<p>A Hot conductor wired to position #1 (phase A)</p> <p>B Hot conductor wired to position #2 (phase B)</p> <p>C Hot conductor wired to position #3 (phase C) ¹</p>

Compatible RELOC® Cables for Industrial Luminaires (ordered and shipped separately)



Notes

- ¹ C, ABE, and C12S options are not used with Quick-Flex QFC, QSFC, QPT, and QD.

PRODUCT INFORMATION

Advanced plug-in system with three-circuit capability. Available on industrial and strip products and a variety of architectural products mounted in continuous rows. 1, 2, 3 and 4-lamp fixtures. PLR22 (2-circuit) and PLR33 (3-circuit) crossover harness switches hot circuit serving next fixture in row. Reduces fixture types on job for alternating circuit applications (see example below.)

Easy one-step installation, saves up to 35% on labor costs. Expanded switching flexibility helps save energy.

Rows can be 50% longer with two-circuit systems. Polarized, lock-together nylon connectors prevent miswiring in the field. #12 THHN conductor, rated 600V, 90°C. White neutral wire included. Grounding accomplished by fixture in-row connectors.

CSA certified systems available with up to 2 circuits. G ground required.

Note: Specifications subject to change without notice.



Wiring
PLR

Advanced 3-Circuit Plug-In

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Series	Number of hot wires	Branch circuits	Dimming	Ground
PLR	(blank) Not required for 22 or 33	<u>Circuits to which ballast is connected</u>	LV Low-voltage dimming	(blank) No ground in PLR
PLR22	1 Black	(blank) Not required for 22 or 33		G Ground. Maximum 2 circuits
PLR33	2 Black and red	A Black wire		
	3 Black, red and blue	B Red wire		
		C Blue wire		
		Emergency circuit connected		
		(blank) No emergency circuit		
		ELA Emergency circuit wired to black wire		
		ELB Emergency circuit wired to red wire		
		ELC Emergency circuit wired to blue wire		

Typical Applications

- Multiple-circuit and single-circuit for longer continuous rows
- Multiple-circuit with alternating fixtures on separate circuits, 2-circuit (PLR 22) and 3-circuit (PLR 33)
- Multiple circuit with night-lights located along row as desired

TYPICAL APPLICATIONS										
PLR 3 C	PLR 3 C	PLR 3 C	PLR 3 C	PLR 2 B	PLR 2 B	PLR 2 B	PLR 2 B	PLR 1	PLR 1	PLR 1
(All PLR22)										
Circuit A	Circuit B	Circuit A	Circuit B	Circuit A	Circuit B	Circuit A	Circuit B	Circuit A	Circuit B	Circuit A
(All PLR33)										
Circuit A	Circuit B	Circuit C	Circuit A	Circuit B	Circuit C	Circuit A	Circuit B	Circuit C	Circuit A	Circuit B
PLR 3 A	PLR 3 A	PLR 3 A	PLR 3 C	PLR 3 B	PLR 3 B	PLR 3 B	PLR 3 C	PLR 3 A	PLR 3 A	PLR 3 A

PRODUCT INFORMATION

A standard occupancy time delay is also present to ensure lights turn off (once minimum on timer has also elapsed) if no occupancy is detected.

This timer is factory set at 10 minutes to promote energy savings, but is adjustable between 30 seconds and 30 minutes. These adjustments may be done through the unit's push-button.

FEATURES

- Four interchangeable lenses - high mount 360°, low mount 360°, high mount aisleway, and small motion 360°.
- Integrated mounting bracket drops lens down 3" from chase nipple - no bracket accessory required.
- 100% digital PIR detection - provides excellent RF immunity

Note: Specifications subject to change without notice.



Passive Infrared Indoor Occupancy Sensor

LSXR

Single Relay



ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: LSXR 10 ADC HVOLT 30M

Series	Lens option	Dimming/photocell
LSXR Passive Infrared Indoor Occupancy Sensor	(blank) No lens 610 High and low mount 360° 6 High mount, 360° 650 High mount 360° and aisleway 10 Low mount, 360° 3PK High and low mount 360° and aisleway 50 High mount aisleway 4PK All lenses 9 Small motion, 360°	(blank) None HL High/low occupancy operation P Switching photocell (on/off) ADC Dimming and switching photocell ANL Dimming and switching photocell with high/low occupancy operation

Voltage	Max dim level	Min dim level	Lead length	Temp humidity	Default time delay
(blank) 120-277 VAC (MVOLT)	(blank) 10 VDC	(blank) Minimum dimming level of ballast	(blank) 14"	(blank) None	(blank) 10 minutes (with minimum 15 minutes on time)
HVOLT 347-480 VAC	9H 9 VDC	1V 1 VDC	42L 42"	LT Low temperature	5M 5 minutes (LED only)
	8H 8 VDC	2V 2 VDC			15M 15 minutes
	7H 7 VDC	3V 3 VDC			20M 20 minutes
		4V 4 VDC			30M 30 minutes
		5V 5 VDC			
		6V 6 VDC			

For additional information see www.lithonia.com



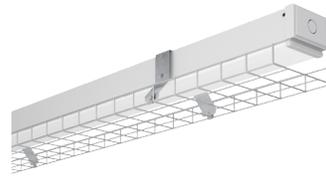
OPTIONS AND ACCESSORIES



Narrow reflector
Ships separate from fixture.
Order as:
CLXRN24
CLXRN36
CLXRN48
CLXRN96



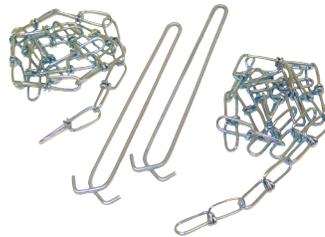
Wide decorative reflector
Ships separately from fixture.
Order as:
CLXRW24
CLXRW36
CLXRW48
CLXRW96



Wireguard
Ships separately from fixture:
96" fixture requires two WGCLX48.
Order as:
WGCLX24
WGCLX36
WGCLX48



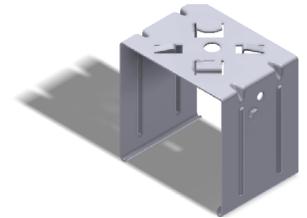
Aircraft Cable with Canopy
Available in 120" or 240"
Order as:
ZAC120
ZAC240



HANGER CHAIN
36" chain with Y hanger. ships as a pair
Order as:
HC36



ZACVH HANGER
10' Aircraft cable with Y hanger.
Order as:
ZACVH



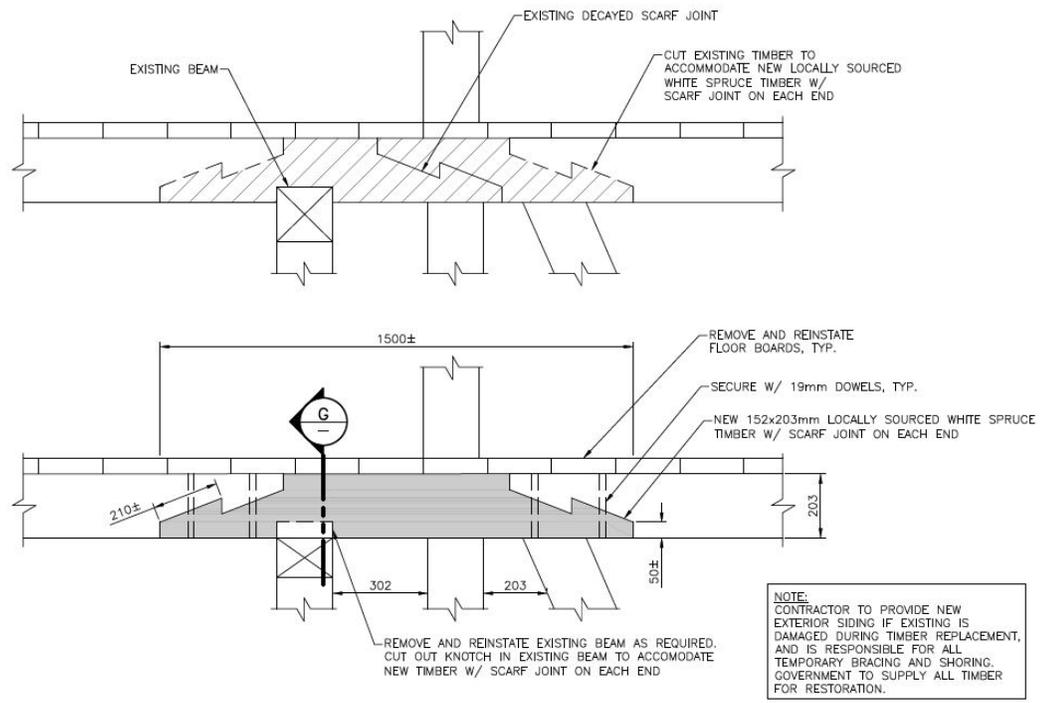
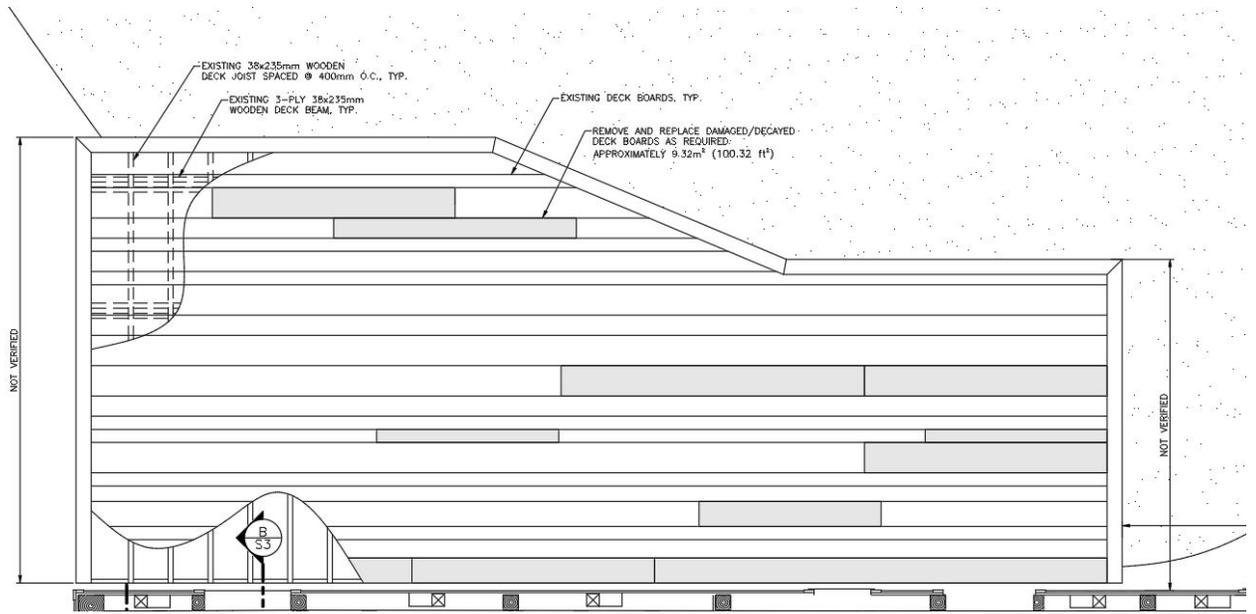
Tong hanger
Ships as a pair
Order As:
THCLX

Appendix B

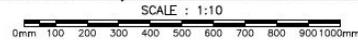
**Hopedale Mission National Historic Site
Provisions Warehouse Recapitalization
Project #1131**

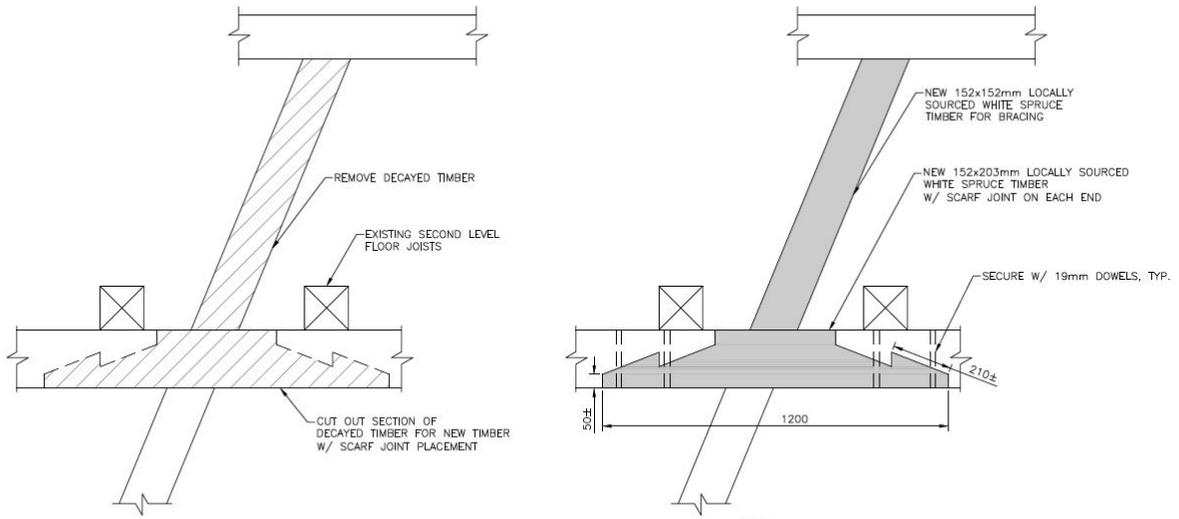
LIST OF LOCALLY SOURCED MATERIALS

TIMBER JOINT SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
7" x 7"	8'-0"	22	2 for shiplap joints, 20 for practice (see details)
6" x 8"	8'-0"	22	2 for scarf joints, 20 for practice (see details)
6" x 6"	8'-0"	23	1 for scarf joint, 2 for diagonal bracing, 20 for practice (see details)
FENCE TIMBER SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
6" x 6"	12'-0"	5	5 posts required
2" x 4"	8'-0"	8	8 cross bars required (2 per section)
1" x 4"	8'-0"	50	Approx. 46 boards required (allow extra)
DECK BOARD TIMBER SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
1" x 6"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 8"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 10"	8'-0"	4	Approx. 2 boards required (allow extra)
1" x 12"	10'-0"	6	Approx. 4 boards required (allow extra)
2" x 10"	12'-0"	3	Approx. 3 boards required for blocking
HORIZONTAL CLAPBOARD SIDING SCHEDULE			
DIMENSIONS	LENGTH	QUANTITY	COMMENTS
Match Existing	14'-0"	20	For general replacement use



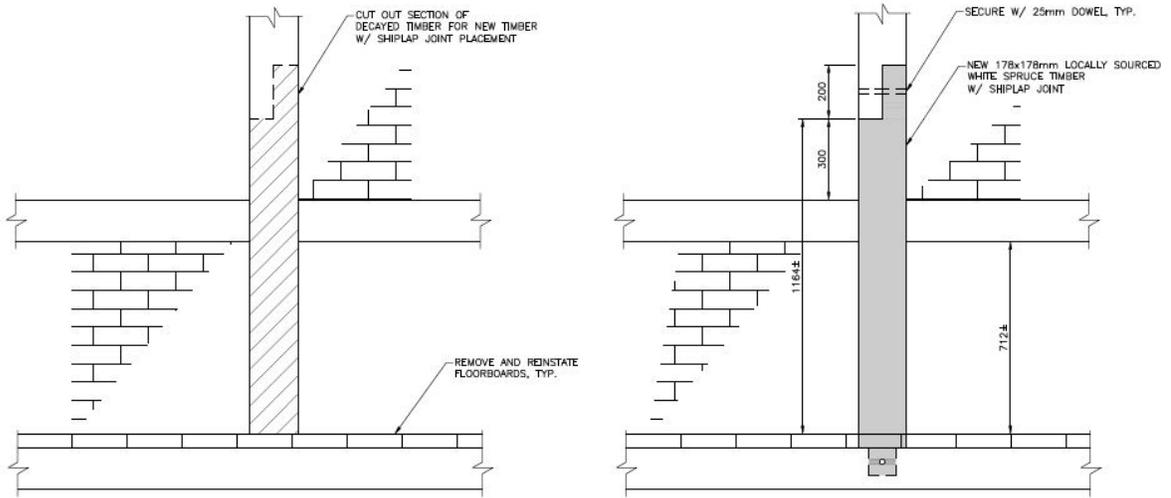
DETAIL: NEW TIMBER W/ SCARF JOINT ON EACH END





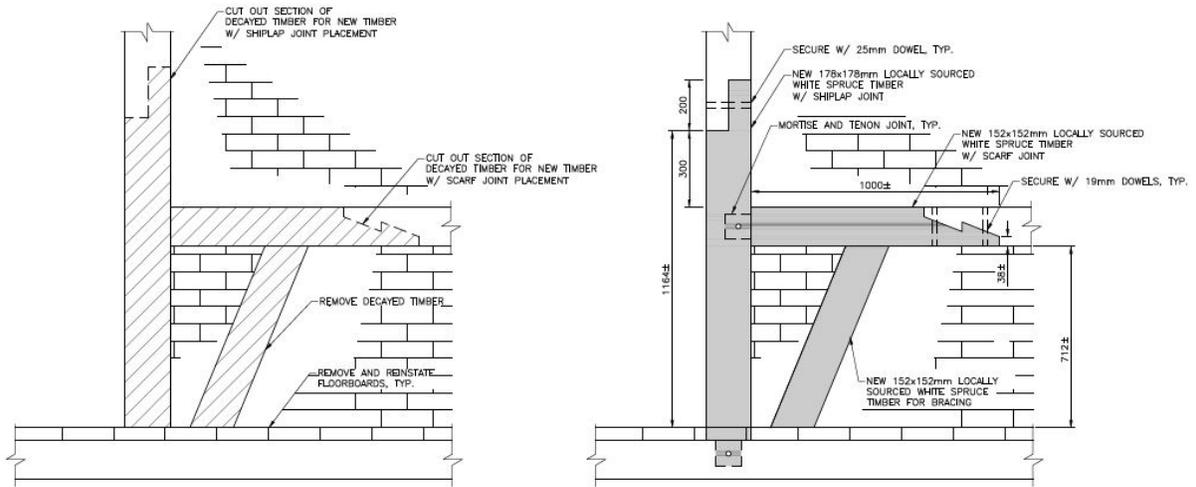
DETAIL: NEW TIMBER W/ SCARF JOINT (6)

SCALE : 1:10
 0mm 100 200 300 400 500 600 700 800 900 1000mm



DETAIL: NEW TIMBER W/ SHIPLAP JOINT (7)

SCALE : 1:10
 0mm 100 200 300 400 500 600 700 800 900 1000mm



DETAIL: NEW TIMBER W/ JOINT REPLACEMENT 8

